ORIGINAL RESEARCH PAPER

Medical Science

A STUDY TO COMPARE THE CLINICO-EPIDEMIOLOGIC PROFILE OF OSTEOARTHRITIS OF KNEE OF MIDDLE AGED WITH ELDERLY PERSONS IN JODHPUR CITY

KEY WORDS:

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ABSTRACT

Osteoarthritis (OA) is the most prevalent form of arthritis in India, affecting over 15 million adults every year. One in two adults will develop symptoms of knee OA, while one in four adults will development symptoms of hip OA by the age 85 and one in 12 people above 60 years or older have hand OA. Although OA occurs in people of all ages, osteoarthritis is most common in people older than 65. The prevalence of knee osteoarthritis is 22% - 32% in India; commonly females are more affected than males as the age progress. 5 More than half of those with arthritis are under 65 years of age. OA knee increases with age (older than 50 years), especially in women. According to a survey, anywhere from 6% to over 13% of men, but between 7% and 19% of women, resulting in a 45% less risk of incidence in men. According to Kallgren Lawrence scale, knee joints symptoms, it states that middle-aged individual feel less pain as compared to elderly age individual and knee joint examination shows inflammation, swelling, scar, shape alteration, muscle wasting present in lesser individual among middle age group as compared to elderly age group. Lastly 15% of middle age screened participants were having hypokalaemia(<6.7%mg/dl), as compared to 18% of elderly age group and 42% of middle-aged participants were having vit. D3 deficiency as compared to 45% of elderly age group participants, which shows that as the age progresses the participants of hypokalaemia increased and with the age increase, vit. D3 deficiency also increases, and which play major role in severity and complication of OA. 411 patients (<60 year = 201; >60 year = 210) were studied for osteoarthritis of knee joint symptoms, signs, investigation at Shri Shivram Nathu Ji Tak Government Satellite Hospital Mandore, AGH: Dr S N Medical Collage, Jodhpur (Raj.) during January 2019 to October 2019. Osteoarthritis is more prevalent in females (58%). Osteoarthritis is more common in active physical worker, especially in females due to their job profile like prolong standing and squatting (for doing household moping etc).Vitamin D3 level and deficiency not significantly similar in both groups due to the regular supplementation. Left knee of both age group was found more common, we cannot find any explanation for this, further studies to be done upon this.

Introduction

Osteoarthritis (OA) is the most common type of arthritis in both developed and developing countries. It is a chronic, progressive musculoskeletal disorder characterized by gradual loss of cartilage in joints which results in bones rubbing together and creating stiffness, pain, and impaired movement. The disease most commonly affects the joints in the knees, hips, hands, feet, and spine. The disease is associated with modifiable and non-modifiable risk factors such as obesity, lack of exercise, genetic predisposition, bone density, occupational injury, trauma, and gender.

Osteoarthritis (OA) is an enlightened disorder of cartilage degradation, synovial inflammation, osteophyte formation, thinning of joint space and sub-chondral sclerosis (Attur M et al, 2013; Rousseau J et al, 2012). Cartilage act as cushion between the bones of joints and prevent the rubbing of bones on each other. In between two cartilage of bone joint, synovial fluid filled, which secreted by synovial membrane for lubrication of the joints. OA leads to pain, disability as well as difficulty in joints and restrict the routine movements of human beings (WHO, 2002).

Epidemiology

Globally, as of 2010, approximately 250 million people had osteoarthritis of the knee (3.6% of the population) (1,2). Hip osteoarthritis affects about 0.85% of the population (1).

As of 2004, osteoarthritis globally causes moderate to severe disability in 43.4 million people (66) Together, knee and hip osteoarthritis had a ranking for disability globally of 11th among 291 disease conditions assessed (1).

Osteoarthritis is the most prevalent form of arthritis and occurs especially in the knee joint. It affects nearly 6% of all adults, but more women are affected than men. (5) "According to a number of published reports, anywhere from 6% to over 13% of men, but between 7% and 19% of women, over 45 years of age are affected, resulting in a 45% less risk of incidence in men (Coleman, et al)."

Age is a determining factor in the development of OA. "As the population ages in demographic terms, the prevalence of OA is expected to rise (Coleman, et al)." From the age of 40 there is an increased risk of OA. Approximately 50% of the 65+ population are affected by OA in the knee, but it can also affect young people (3,4).

Age is not the only factor that plays a role in the evolution of OA. Other risk factors are (5):

- Obesity
- Joint hypermobility or instability
- Sport stress with high impact loading
- Repetitive knee bending or heavy weightlifting
- Specific occupations
- Peripheral neuropathy
- Injury to the joint
- History of immobilisation
- Family history

Aims & Objectives:

We hypothesize that there is a significant difference in the clinico-epidemiological profile of middle aged as compared to elderly persons suffering from osteoarthritis of knee and the severity assessed by radiologic scale correlates with deteriorating functional scale

1. Primary Objective – To compare the clinical and epidemiological profile of osteoarthritis of knee of middle-aged people with the elderly people of Jodhpur city

2. Secondary Objective – To find out the factors causing early osteoarthritis changes in knee joints of middle-aged people.

- To spread awareness about osteoarthritis in the people coming up for check-ups

Kellgren Lawrence grading

Acute   OA, 1 grade OA, 2 grade OA, 3 grade OA, 4 grade

- **Grade I** = There is a doubtful narrowing of joint space narrowing [A normal joint, therefore, appears to have a space between the bones. Any decrease in space implies a reduction in cartilage cover.] and possible osteophytes [small bony projections that from around joint margins. They are responsible for limiting the range of motion and can cause pain.]

- **Grade II** = There is the presence of osteophytes and possible joint space narrowing on the anteroposterior weight-bearing radiograph. [weight bearing radiographs imply X-rays taken while the person stands on both the feet. A non-weight bearing x-ray is taken when a person is lying down and thus not bearing weight on knees]

- **Grade III** = Grade III Kellgren Lawrence is characterized by multiple osteophytes, definite joint space narrowing, sclerosis [seen as increased white areas in the bone at the joint margin] and possible bony deformity.

- **Grade IV** = It is characterized by large osteophytes, marked joint space narrowing, severe sclerosis, and definitely bony deformity.

ARTHRITIS IMPACT
MEASUREMENT SCALES 2 (AIMS2): The AIMS cover physical, social and emotional well-being and were designed as an indicator of the outcome of care for arthritic patients. The original instrument includes 45 items grouped into 9 Guttman scales that assess mobility, physical activity (walking, bending, lifting), dexterity, household activity (managing money, medications, housekeeping), social activities, ADLs, pain, depression, and anxiety. Most of the questions refer to problems during the past month. The AIMS2 contains 78 items, the first 57 are grouped into 12 scales. The 12 scales can be further grouped into 5 components: Physical (e.g., mobility, walking and bending, hand and finger function, arm function, self-care and household tasks); Symptoms (arthritis pain); Role (work); Social Interaction (social activities/support), and Affect (tension and mood). A further 44 items cover satisfaction with health, impact of arthritis on functioning and priorities for improvement

Examination
- **Inspection:** Mind the position of the joints when in rest and how the patient moves. This can be accomplished by making the patient perform simulations of daily activities such as getting up from and down on a chair, stair climbing, etc.

- **Palpation:** Mind: swelling, temperature differences, muscle tonus. Also be wary of possible bone spurs (osteocytes) that have formed on the edge of the joint. These osteocytes are a serious indication towards osteoarthritis.

- **Examination of basic functions:** Testing of muscle power, coordination, mobility, balance and stability of the joint. These factors can be tested by active test like standing on one leg and passive manual tests. When testing stability of the joint muscle strength and proprioception are significant

Measuring Scales / Tools used in Medical Performa
- Kuppuswamy's Socio Economic Scale
- Visual Analogue Scale (VAS) Scale

Study participants and sample
Patients coming to to OPD of Dr S N Medical College, Jodhpur group hospitals along with additional attached group of hospitals (AGH) were registered for study after explaining them and with their informed consent form.

Inclusion Criteria
1. Patient of middle age group (35-to-59-year age) and Geriatric age group (60 year and above) coming to government hospital OPD with complain of pain at knee joint more than 01 month and are ambulatory

Exclusion Criteria
1. Patient in critical condition
2. Patient not supportive
3. Patient refused for consent
4. Patient with recent trauma or injury

Sample Size: 400 (Middle Age: 200 and Geriatric Age: 200)

Assessment: 1. Patient Detailed History (Medical Performa) **2.** ADL's and Grading **3.** Examination tools (Arthritis Impact Measurement Scale 2) **4.** X-ray and Classification (Kellgren and Lawrence Grading) **5.** CBC **6.** ESR **7.** Serum Calcium and Vitamin D 3 Test **8.** Serum Uric Acid **9.** RF

Investigation 1. CBC (WBC/ RBC/ Platelets/ Haemoglobin) 2. Erythrocyte Sedimentation Rate (ESR) 3. Rheumatoid Factor (RF) 4. Serum Calcium 5. Serum Uric Acid 6. Vitamin D3 7. X Ray

Data Collection: Data collected by using a modified version of the AIMS2 Scale and Medical Proforma. The collected data is stored in the form of spreadsheets in the MS-Excel software.

Outcome Measures: Outcome measures questions taken from based on American College of Rheumatology (ACR): Guideline for the Pharmacologic and Non-Pharmacologic management of osteoarthritis of Hand, Hip and Knee: Project plan – September 2018 - Arthritis Impact Measurement Scale (AIMS)

Ethical Consideration: The required approval has been taken from the IRB / Ethical Committee, Dr S N Medical College, Jodhpur (Raj.). Informed consent will be taken from the participants.

Expected Limitations: The major limitation of this study is that the sample size may not be truly representative of the entire population. Also, the research may be limited by information bias.

Observation & TablesTable 01: Occupation ad Age wise distribution of study population with socio-economic aspects - (Annexure Table 01)
There were high frequency of knee pain more in age group of 60 – 69 years of age. Observation shows that OA >70 year is equal in male and females but is significantly high in between age group of 40 – 49, 50 – 59 and 60 – 69, and has difference maximum in age group of 60 – 69.

Table 01 shows people < 60 year of age group shows more cases of OA as compared to elderly age group working in office, where as the difference is less in active physical work group (like housewife)

Among Socio economic status depicts that there were 53.71% of Upper Lower grading in screened patients, among which 28.71% were from middle age and 25.06% were from elderly age group. Another with 36.098% was of Lower Middle grade among screened patients, with 17% of middle age and 19.95% of elderly age persons.

Table 02: Arthritis Impact Measurement Scale (AIMS) (Past Month) - (Annexure Table 02)
Table 02 shows mean mobility level score in middle age group is 11.26 as compared to elderly group 13.29, which shows the basic of grading value Grade 03 (some days), that sometimes the persons of both age groups are able to perform their basic mobility activities like use of public transportation, drive car etc. according to AIMS-2 scale, with the probability value (P-Value) of 0.0007, which shows that there can be no compassion between these two groups regarding mobility section.

Table no. 02 shows 48% of middle age group, with the mean value of 18.65±4.06, which means that this age group can perform household tasks with grade of 02 (Most Days) like running, lifting heavy objects, climbing stairs, bending etc. according to AIMS-2 scale, while compared to 52% of elderly person with the mean value of 8.71±4.59 can perform their household tasks with grade of o2 (very Often). It shows least or border mark statically significance of P.value 0.068

Table no. 02 shows 48% of middle age group, with the mean value of 5.88±2.27, which means that this age group can perform hand and finger tasks easily with grade of 01 (All Days) like writing, button a shirt, turn a key in lock etc. according to AIMS-2 scale, while compared to 52% of screened elderly person with the mean value of 6.76±2.97. It shows least statically significance of P.value 0.0007

Table no. 02 shows 48% of middle age group individual have mean significant self-score of 15.79 and 52% of elderly age group having mean score of 15.22, which shows that they can perform their basic activities of daily living (ADL) like shower, dressed, use toilet and get in and out of bed with grade of 02 and 03 (Very often and sometimes) according to AIMS-2 scale. Table no. 02 shows 48% of middle age group, with the mean value of 7.88±4.71, which means that this age group can perform household tasks with grade of 02 (Very Often) like going to shopping, prepare their own meals etc. according to AIMS-2 scale, while compared to 52% of elderly person with the mean value of 8.71±4.59 can perform their household talks with grade of o2 (very Often). It shows least or border mark statically significance of P.value 0.068

In the given table no. 02 Social Activity of past month depicts that 48% of middle age participants have mean score of 13.044, which shows they visits to their friends most often and some days their friend use to come their home, they mostly often use telephonic contact and write text to their friends, also they attend meeting, go to church/temple/mosque for some days, according to AIMS-2 scale, while that of 52% of screened elderly age group have their mean score of 12.676, which is more toward Grade of 03 (some days) which means they cannot have social activity most often, only some days they come and visits to their friends, relative also they use telephonic contacts for some days.

In task from support from family and friends shows the middle age group participants get assistance from family very often, while elderly age group always needs and gets assistance, according to AIMS-2 scale. Similarly, family and friends are always sensitive to personal needs, also they are interested in solving their problems for middle age and elderly age group persons. The family and friends also understand the effects of arthritis same for that of middle age and elderly age persons. However, the mean age group for middle age is 6.7±2.87 while for elderly age group is 7.75±3.07

For Arthritis pain, middle age group mean score vales range from 13.721±4.11 which shows mild to moderate score grading and they feels pain in morning and sometimes difficulty during sleep due to pain, while the mean of elderly persons is 12.138±4.10 which shows the mild to moderate pain, affecting pain mostly during sleep and early morning stiffness, according to AIMS-2 scale.

Regarding Work section, most of the participants of middle age and elderly age are housewife, unemployed and retired person. The middle age group mean score ranges from 15.029±4.13, which stats that sometimes they are unable to do any paid work, household work due to pain. Whereas in elderly age group the mean score of work task is 14.552±4.19, which shows few days they can do paid work, household work, according to AIMS-2 scale grading

Table 03: Knee Joint Symptoms - (Annexure Table 03)
In table 03 when the patients were graded on the basis of the Kellegren & Lawrence scale, it was seen that 43.78% of middle-aged screened persons had normal knee pain as compared to 39.5% of elderly age. The nature of pain was observed to be majorly of dull nature with a significant pressure complains of sharp pain as well. The ratios of nature of pain across both groups was similar with the exception of slightly high cases of sharp pain in the elderly (45.71%) as compared to the middle aged (39.30%). The course of pain was observed to be more on the popliteal side of knee in elderly (19.04%) as compared to the middle aged (14.42%).

Table 04 Knee Joint Examination - (Annexure Table 04)
upon examination, 60.95% of elderly had inflammation of knee joint as compared to 49.25% in the middle aged. The cases of swelling were also higher in subjects above 60 years of age (61.42%) when compared with those below 60 year of age (51.24%). The elderly age group also present with more prevalence of shape alteration or deformity (14.28%) in comparison to middle aged group (9.45%). The ratios of tenderness and crepitus were also significantly higher (60.47% & 42.85%) respectively in those above 60 years of age when put against those below 60 years of age (50.24% & 32.83%) respectively.

In Table 4 the knee examination of patients, it was found that the active range of motion (ROM) of middle-aged person was significantly higher than the elderly aged persons. The ROM in middle aged group were classified as 3.7% in 0–120-degree range, 28.6% in 0–130-degree range, 59.45% in 0-140 degree and 8.2% in >140 degree range, whereas ROM in elderly age group was markedly different and was represented as 12.61% in 0-120, 56.19% in 0-130, 27.14% in 0-140 and 4.04% in >>140 degree range. These results show that with advancing age there is continuous loss of active ROM in those affected with osteoarthritis. The other parameters like

passive ROM end feel, pain at specific ROM and limb length were observed to be similar in both the groups.

Table 05: Investigations - (Annexure Table 05)
Figure represents the mean X-ray grading according to Kallgren & Lawrence Scale of Osteoarthritis of Knee. It shows that in middle age group the mean value of x-ray of right is 1.65 as compared to left knee 1.88, whereas in elderly age group the mean value of x-ray grading in right knee is 1.87 as compared to left knee 2.10. 15% of middle age screened persons are having hypokalaemia (<6.7 mg/dl value) as compared to 18% of elderly persons age group, which shows major role in severity and complications of OA normal Vit D3 value ranges from 30 – 100, among which 42% of participants of middle age group were having Vit. D3 deficiency and that of 45% of elderly group of participants, which shows Vit D3 deficiency gets increased up as age increases.

Discussion
In our study we have studied the two groups, one below 60-year age (control group) and another above 60-year age (case group). The study was conducted at Shri Shivram Nathu Ji Tak Government Satellite Hospital Mandore, AGH: Dr S N Medical College, Jodhpur Raj.). Total 411 patients were studied, out of which case group number of patients n=210 (Male= 80: Female=121) whereas in control group number of patients n=201 (Male= 94: Female=116). In control group most of them were office worker (52%) whereas in case group (54%) active physical worker and retired persons were there. In both age group maximum people (90%) belongs to lower middle class (40%) and upper lower class (53%). In both group body build was found moderate. In our study AIMS-2 scale mobility level, hand and finger variable, arthritis pain were significantly common in elderly age group whereas walking & bending, self-care, social activity, support from family and friends, work, tension level, mood, satisfaction with each health area, arthritis impact on each area of health were not significant in both groups. Tenderness is most common in elderly age group

While examining knee joint, inflammation, swelling, scar, muscle wasting, shape alteration and skin condition were similar in both groups, whereas during palpation, tenderness was more significantly more (P Value = 0.047) common in elderly population. Active range of motion (AROM) and passive range of motion (PROM), limb length and muscle girth were similar in both age group, whereas muscle power was significantly decreased (P value = 0.001) in elderly age group. In elderly age group 64% patients had abnormal x-ray findings, whereas in middle age group 55% were having abnormal x-rays. Vitamin D3 deficiency was almost similar in both age group, higher nearby to normal range may be because of regular supplementation of vitamin D3 in elderly age group. By observation, seen the osteoarthritis is more prevalent in female (57.66 %) as compared to male (42.34%), because of osteoporosis female which is due to pre menopause or menopause stage which affect calcium absorption from intestine.

It is seen that frequency Osteo arthritis in 50-59-year group is 18% which rises to 34.06%. there was a drastically fall in frequency for age group 70-79 (10.9%) which is going down for above 80 group (6.08). The reason maybe, because of Menopause in females or the life expectancy of India is 67/70 years., according to WHO, life expectancy at birth male/female (year 2016). In occupation wise distribution, OA is more prevalent in active physical work and office group pf people, in office group. It is more in middle-aged individual than elderly age group participants. Which is may be due to retirement age (60 years). And officers must work continuously in same position of long hours. And in active physical work, elderly participants show more OA because of many females in Rajasthan have habit of doing all the household work regularly. According to Kuppuswamy

socioeconomic status scale, this is observed from the above result that prevalence of OA is more in lower middle status and upper lower scale group. It may be due to lack of awareness and more of stress or family responsibility which have negative impact on cartilage and joints and lead to degradation of health. Prevalence of OA is more in average/moderate body built and less frequent in lean and obese and more in elderly group individual.

According to AIMS impact measurement scale it is observed that, middle age and elderly age group individual shows less statistical significance in mobility level, walking and bending, hand & finger variable but there is some statistical difference between middle age and elderly age group regarding self-care, social activity, support from family and friends, arthritis pain, work, tension level, mood, satisfaction with each health area, arthritis impact on each area of health, most like to see improvement variable. Middle age and elderly age group individual can perform basic activities like shower, dressed, use toiled etc. More often to sometimes. But in term of performing social activity, middle age group participants can do most often whereas elderly individual can do someday only. In elderly individual need help or assistance in performing social activity. Similarly, middle age group feel arthritis pain mainly in morning while elderly age individual feel pain during sleep and early morning. So according to AIMS scale middle age group and elderly age group individual can perform basic activities but need help in performing many other works and they have different perception regarding severity of arthritis pain. It also states that there is statistical difference between elderly age group and middle age group regarding OA pain.

Result & Conclusion
It was found that prevalence of severe osteoarthritis is more common in female (57.66%) as compared to male (42.34%) among all the participant in the study and it is more prevalent in elderly age group (60 – 69 year) in the study than middle age group. People <60 year of age group shows more case of osteoarthritis as compared to elderly group working in offices, whereas the difference is less in active work group (physical activity) like housewife. Among screened patients it was found that "upper lower class" socioeconomic grading, based on Kuppuswamy Socioeconomic Scale Grade shows a greater number of cases of osteoarthritis of knee as compared to others. X-ray grading, according to Kellgren Lawrence Scale of Osteoarthritis of knee, it was found that patient is having osteoarthritis impact more in left knee as compared to right knee joint, also it was found that Vit. D3 deficiency gets increased up as the age progression goes on. Osteoarthritis is common chronic lifestyle changing disease which can be prevented by regular nutrition supplementation and exercise. This disease may cause disabilities and will lead to social isolation and dependency on the family and society. Timely diagnosis and treatment is another way of maintaining an individual's physical activity and activity of daily living (ADL) and mobility levels. Females are more commonly involve, so needs special care and specific work (affecting knee joint) alteration changes.

Annexure
Table 01

Occupation	Middle age< 60 (n=201)	Elderly age > 60 (n=210)	Total
Office	105	30	135 (32.85%)

Active physical work	93	115	208(50.61%)
Retired	00	58	58 (14.11%)
Labor	03	07	10 (2.43%)

Table 02

	Middle age< 60 (n=201)	Elderly age > 60 (n=210)	P value
Mobility Level	11.26±5.54	13.29±6.46	0.0007
Walking & Bending	18.65±4.06	18.70±3.84	0.892
Hand & Finger Variable	5.87±2.27	6.76±2.97	0.0007
Self-care	15.79±5.63	15.22±5.33	0.295
Social Activity	13.04±2.84	12.67±2.87	0.051
Support from family and friends	6.71±2.87	7.75±3.07	0.582
Arthritis Pain	13.72±4.11	12.13±4.10	0.009
Work	15.02±4.13	14.55±4.19	0.638
Tension Level	12.75±3.66	13.16±3.36	1.051
Mood	12.24±11.87	11.87±2.15	0.059
Satisfaction with each health area	25.88±8.02	29.02±8.01	0.111
Arthritis impact on each area of health	19.08±11.20	22.20±10.83	0.287
Most like to see improvement	3.11±0.36	3.10±0.38	0.394

Table 03

		Middle age< 60		Elderly age > 60		x^2 value	P Value
Knee Pain (According to	Normal (Grade 0,1)	Abnormal (Grade 2,3,4)		Normal (Grade 0,1)	Abnormal (Grad		
	88	113		83	127		
1. Nature of Pain	Dull 116	Normal 106	Sharp 79	Dull 104	Normal 10	Sharp 96	3.11	0.21
2. Onset	Morning Stiffness 11	Regular 190		Morning Stiffness 18	Regular 192			.3
3. Pain Course (if radiates)	No Pain 171	Calf Muscle 01	Popliteal Side 29	No Pain 161	Calf Muscle 01	Popliteal Side 40	1.56	0.45
4. Pain Aggressive Factor	Standing 22	Walking 21	Standing + Walking 158	Standing 21	Walking 12	Standing + Walking 177	3.36	0.18
5. VAS Scale	5 – 6 164	7 – 8 37		5 – 6 145	7 – 8 65			

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