IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

Find Prevalence Of Osteoarthritis In Young Working Professionals A Cross-Sectional Study

1PATEL DEVANSH, 2Dr. SHIVAM AACHARYA, 3Dr. ARVIND CHAUHAN
1BACHELOR OF PHYSIOTHERAPY, 2MASTER OF PHYSIOTHERAPY IN CARDIOPULMONARY CONDITIONS, 3PhD IN PHYSIOTHERAPY
1SWARRNIM STARTUP AND INNOVATION UNIVERSITY,
2SWARRNIM STARTUP AND INNOVATION UNIVERSITY,
3SWARRNIM STARTUP AND INNOVATION UNIVERSITY

ABSTRACT

BACKGROUND AND OBJECTIVES :

This study was conducted to find the prevalence of osteoarthritis of knee in young people age between 21 to 30 years having sitting or standing work profession. The purpose of the study was to find prevalence ratio of OA in young people. Osteoarthritis (OA) is defined as a heterogeneous group of conditions that lead to joint symptoms and signs associated with a defective articular cartilage and related changes in bone morphology. It is considered the most common type of arthritis, as well as one of the most significant health problems that pervades our modern world. In 2019, it was estimated that 43 million adults suffered from arthritis. Of those, 26.9 million adults aged 25 years or older had OA. One in four people is expected to develop symptomatic OA in his or her lifetime.

INTRODUCTION :

Arthritis is a common joint problem usually associated with older adults. And there are very less study/,research Conducted on osteoarthritis in young age. According to the National Library of Medicine (NLM)Trusted Source, most people show symptoms of osteoarthritis by the time they are 70 years old, but there are also potential chances of osteoathritis in young age. So, this research helps to determine the Prevalence rate in various conditions. So this study may help to determine the prevalence ratio of OA in young people.

METHODOLOGY:

Research will be done on around 100 subjects age between 21 to 30 years with having sitting or standing profession to find Prevalence ratio for OA in young people.

Prevalence rate will be calculated by below formula.
* Prevalence percentage = OA will be found for given
Criteria / OA Will be not found for given criteria (Number of sub.) * 100 %

An observational study was conducted by using the convenient sample method. One hundred working professionals of ahmedabad and nearby area participated in this study by performa validated assessment form and clinical measures.

RESULT:

The prevalence of OA varies according to the definition of OA, the specific joint(s) under study, and the characteristics of the study population. The age standardized prevalence of radiographic knee OA in given subjects age between 21-30 years was only 5% among the all participants. Out of 100 subjects only 5 subjects primarily suspected of having OA of knee. Out of 100 subjects there was 56 female and 44 male subject in this survey. And OA was found in 3 female and 2 male subject after assessing clinical measures.

So, the prevalence percentage of OA of knee in young people age between 21 to 30 years having prolonged sitting or standing work profession would be as below:

$$\text{Prevalence percentage} = \frac{\text{OA will be found for given Criteria}}{\text{OA Will be not found for given criteria}} \times 100$$

PREVALENCE PERCENTAGE = 5/95 * 100% = **5.2631%**

A sum of 100 working professionals responded answering the questionnaire. An analysis was done by excel & calculation was done by chi square test calculator. The chi- square statistics found as **0.1695.** The p value is **0.918761**. The result is not significant at **p < .01**.

Keywords : Osteoarthritis , Prevalence , Young working professionals

Introduction

●Osteoarthritis (OA) is a common chronic condition resulting in pain, fatigue, functional limitations, increased healthcare utilization and high economic costs to society. The burden of OA is projected to increase, due in part to obesity and population aging.
●While the prevalence of OA increases with age, there is a growing recognition that OA affects people at younger ages.
●Recent US data demonstrated that half of people with symptomatic knee OA are diagnosed by age 55.

• Osteoarthritis (OA) is one of the most devastating chronic conditions that affect people around the world.
• Although the usual population associated with the condition is the elderly, who are mostly inactive, athletes and younger individuals are also susceptible.
• Depending on the population, the etiology may differ; injuries, occupational activities, and obesity appear to be the most common
causes of OA in young and athletic populations. [1]

Fig 1.1 X-RAY FINDING OF KNEE OA

Left) In this x-ray of a normal knee, the space between the bones indicates healthy cartilage (arrows). (Right) This x-ray of an arthritic knee shows severe loss of joint space.

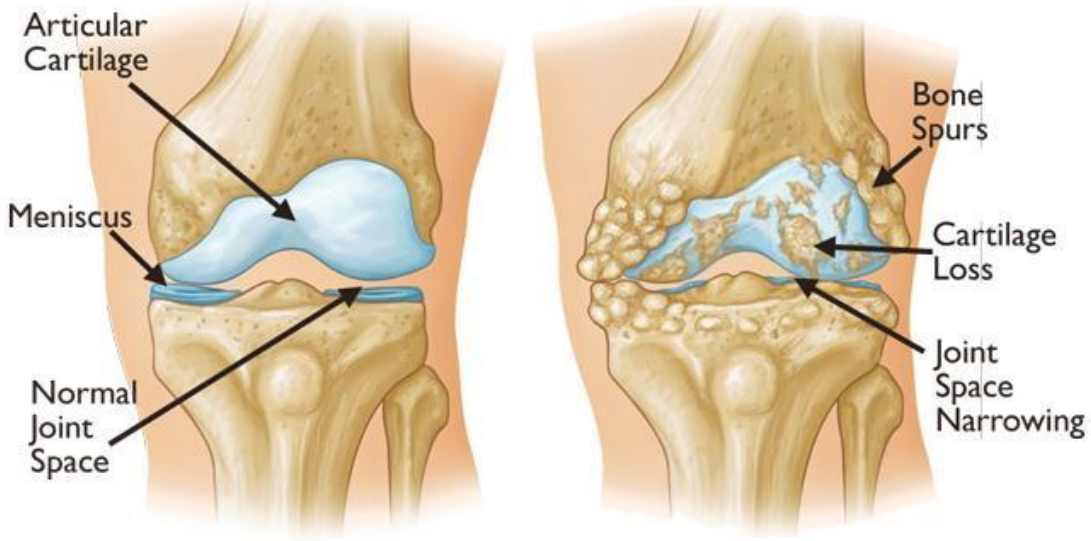


Fig 1.2 NORMAL KNEE VS OA KNEE

Osteoarthritis often results in bone rubbing on bone. Bone spurs are a common feature of this form of arthritis.

Stage 0 represents a normal joint.

- Stage 1 represents very minor wear and tear on a joint, but pain is unlikely.
- Stage 2 represents mild osteoarthritis, which is when most will typically begin experiencing pain and discomfort.
- Stage 3 is designated moderate, where there is obvious cartilage erosion. This may come with joint stiffness, more severe pain, and the experience of popping or snapping sounds.
- Stage 4 osteoarthritis is severe, where the joint space between the bones is considerably reduced. This creates greater friction, which generates more pain and discomfort.

What Are the Symptoms of Osteoarthritis?

• Symptoms of osteoarthritis most often develop gradually and include:
• Joint aching and soreness, especially with movement
• Pain after overuse or after long periods of inactivity
• Stiffness after periods of rest
• Bony enlargements in the middle and end joints of the fingers

(which may or may not be painful)

• Joint swelling
Some Of Potential Causes That Can Develop OA In Young People.
• There are several factors that increase a person's chances of developing osteoarthritis. These include:

• **Heredity**. Some people have an inherited defect in one of the genes responsible for making cartilage. This causes defective cartilage, which leads to more rapid deterioration of joints.
•People born with joint abnormalities are more likely to develop osteoarthritis, and those born with an abnormality of the spine (such as scoliosis or curvature of the spine) are more likely to develop osteoarthritis of the spine.[3]

• **Obesity** . Obesity increases the risk for osteoarthritis of the knee, hip, and spine. Maintaining ideal weight or losing excess weight may help prevent osteoarthritis of these areas or decrease the rate of progression once osteoarthritis is established.

• **Injury**. Injuries contribute to the development of osteoarthritis. For example, athletes who have knee-related injuries may be at higher risk of developing osteoarthritis of the knee. In addition, people who have had a severe back injury may
be predisposed to develop osteoarthritis of the spine. People who have had a broken bone near a joint are prone to develop osteoarthritis in that joint.[3]

• **Joint overuse**. Overuse of certain joints increases the risk of developing osteoarthritis. For example, people in jobs requiring repeated bending of the knee are at increased risk for developing osteoarthritis of the knee.
• Other diseases. People with rheumatoid arthritis, the second most common type of arthritis, are more likely to develop osteoarthritis. In addition, certain rare conditions, such as iron overload or excess growth hormone, increase the chance of developing OA.[3]

•OA isn’t restricted to older adults. Younger adults can also experience symptoms that may signify OA, including:

• morning joint stiffness
• aching pain
• tender joints
• limited range of motion
• Most often pathology develops in women but found in men.
Usually it is detected when it has already happened to
fracture, especially of the femur, which is considered the
most serious and life-threatening.[4]

• After pain, stiffness was identified as a significant
symptom that…
• impacted daily life. Other impactful symptoms included:

• - functional, walking and standing limitations
• - loss of flexibility
• - sleep disturbance
• - fatigue
• - grating (bone on bone) sensation
• - joint swelling
• - disfigurement
• - other numbness and instability (OA VOP 2017)[4]

• Diagnosing OA in athletes and young individuals is sometimes challenging because of their increased pain tolerance. However, the treatment of OA in these populations does not differ from its management in the general population.
• Several considerations need to be taken into account when choosing a treatment modality. The purpose of this review is to address OA in athletes and younger individuals and to discuss its presentation, diagnosis, and treatment.[4]

Clinical Findings for OA

X-Rays – Cartilage loss, a tell-tale sign of osteoarthritis, appears as a narrowing of the space between bones in the joint. While an X-ray image will not show the cartilage itself, your doctor can use this bone proximity to provide a diagnosis. An X-ray can also show bone spurs around a joint, which may cause pain and tenderness.

MRI – A magnetic resonance imaging test, or MRI, can produce detailed images of bone and soft tissues. This includes cartilage. This test is not typically needed for an initial diagnosis, but it can provide more information about the disease's progression.

Blood tests – Certain blood tests can help rule out other causes of joint pain, like rheumatoid arthritis, narrowing your doctor's field of potential diagnoses.

Joint fluid analysis – In this test, your doctor will use a syringe to draw fluid from the affected joint. They then test the fluid to determine whether the inflammation is caused by an infection or gout, homing in on a definitive diagnosis.

Epidemiology

●Osteoarthritis (OA) of the knee is the most common form of joint disease and prevalence of both radio graphically evident and symptomatic. The females having higher prevalence than males (11.4% vs 6.8%).

●The gender difference in prevalence has recently been emphasized in a meta-analyses, which provides evidence for a greater risk in females for prevalent and
incident knee OA.

●The meta-analysis also reported that females tend to have more severe knee OA radio graphically assessed than males and that the gender differences increase with
age > 55 years. The prevalence of OA will increase as the population of the kingdom ages, especially if the incidence of obesity remains at over 50% in the 45+ age.

• OA in adults is frequently accompanied by comorbidities that
• contribute to decreased quality of life:
• - obesity or being overweight (90 percent)
• - hypertension (40 percent)
• - depression (30 percent)
• Osteoporosis at a young age is very rare, so at the first manifestations should be sure to look for the causes of the disease.[2]
• Activity Limitation: • Arthritis limits the activities of 23.7 million US adults. Around 44% of adults with doctor-diagnosed arthritis had arthritis attributable activity limitations in 2013–2015.
• Leading Cause of Work Disability
• Arthritis and other rheumatic conditions are a leading cause of work disability among US adults.3
• In all US states, 1 in 25 working-age adults aged 18 to 64 years face work limitations they attribute to arthritis; among those with arthritis, at least 1 in 4 have work limitations. The prevalence of work limitations due to arthritis varies by state.
•Risks of revision surgery are especially pronounced in the younger patient, who may be more physically active and, consequently, subject to multiple revision surgeries over a lifetime. (DR.S.Bhandari 2012)[5]

NEED OF STUDY

• Arthritis is a common joint problem usually associated with older adults. And there are very less study/research Conducted on osteoarthritis in young age. According to the National Library of Medicine (NLM)Trusted Source, most people show symptoms of osteoarthritis by the time they are 70 years old, but there are also potential chances of osteoathritis in young age. So, this research helps to determine the Prevalence rate and percentage of OA in young working professionals who have prolonged sitting ans standing work profession. So this study may help to determine the prevalence ratio of OA in young people.

OBJECTIVE OF THE STUDY

• To find prevalence of OA in young people(Age between 21 to 30 years) having prolonged sitting or standing work profession in ahmedabad and gandhinagar area.

• *REVIEW OF LITERATURE*

1. Prevalence of osteoarthritis of knee joint among adult population in a rural area of Kanchipuram District, TN [Venkatachalam.J, Natesan.M, Bharath Z] Year -2018.[9]

•A total of 1986 adult respondents were interviewed out of which 27.1% had OA of knee. Age more than 50 years, female gender, tobacco usage, illiteracy, lower socioeconomic class, positive family history of OA, diabetes, and hypertension were found to be associated with OA knee ($P < 0.05$).

• Conclusion: The burden of osteoarthritis knee was high in this region. Hence, effective preventive strategy has to be taken to minimize this burden.

2. Osteoarthritis Affects Younger People, Too by ILANA N. ACKERMAN, PT, PhD (Article published in 2019)[10]

●Conclusion of this study

• In this article researcher found that In younger people presenting with persistent joint pain and transitory stiffness (particularly those who have sustained a previous traumatic joint injury), the early signs of OA should be suspected. Routine imaging is not indicated for the diagnosis of uncomplicated knee or hip OA.
•While X-rays are inexpensive, radiographic findings are not well correlated with symptoms and are unlikely to alter the management plan or predict future disease progression. Magnetic resonance imaging can detect early OA changes that may be useful in a research context,but the clinical significance of these changes is questionable. Overuse of MRI is costly for health systems and may lead to unwarranted surgical interventions.

• These include activity-related joint pain and either no joint-related morning stiffness or morning stiffness lasting no longer than 30 minutes.Atypical features (eg, a hot swollen joint, prolonged morning stiffness, or rapid worsening) warrant investigation, as they may indicate other diagnoses, including inflammatory or septic arthritis, or malignancy.

3. Hip and knee osteoarthritis In young age (ADAM G. CULVENOR, PT, PhD), RANA S. HINMAN, PT, PhD(Vol 2. Feb. 2017)[11]

• Hip and knee OA is not restricted to older age groups and can profoundly affect quality of life and work participation among younger people. Knee joint injury is a strong risk factor for subsequent knee OA, and early signs and symptoms may present in the decade following injury or reconstructive surgery.

•Thorough physical examination can identify key impairments, and PROMs are valuable tools for tracking changes in pain, function, and well-being. Nonsurgical management approaches relevant to younger patients include education and self-management support, physical therapist–prescribed exercise programs, and weight management.

4. Epidemiology of osteoarthritis: state of the evidence. Kelli D. Allen, Yvonne M. Golightly [2019].[12]

• This study concludes the Risk factors with strong evidence for osteoarthritis onset and/or progression include age, sex, socioeconomic status, obesity, family history, joint injury, joint alignment, and occupational joint loading.Traditional epidemiologic studies and mining of large health administrative databases show a large and increasing impact of osteoarthritis.

5. Risk Factors for Osteoarthritis and Contributing Factors to Current Arthritic Pain in South Korean Older Adults.Kyoung Min Lee, Chin Youb Chung, Ki Hyuk Sung, Seung Yeol Lee, Sung Hun Won, Tae Published online 2014 Dec 10.[13]

• The Fourth Korean National Health and Nutrition Examination Surveys was conducted in 2009. Therein, 720 males and 1008 females aged between 25 years to 45 years older were included. Comprehensive data on habitual, socioeconomic, medical, nutritional, and psychological factors were collected along with the presence of osteoarthritis and arthritic pain. After univariate analysis, binary logistic regression analysis was performed to identify risk factors for osteoarthritis and contributing
factors to current arthritic pain. And the study conclude that higher BMI, lack of weekly moderate intensity activity, and unfavorable subjective health status were significant factors contributing to current arthritic pain. More attention needs to be paid to psychiatric effects on osteoarthritis and joint related pain.

6. What Are the common risk factors that cause OA in younger athletes (Whittaker.J 2015)[14]

This study concludes some major and most common risk factors that cause OA in younger athletes that mentioned as below.

• Five common athletic injuries have been identified as placing patients at greater risk of developing post-traumatic OA:

• - anterior cruciate ligament (ACL) ruptures
• - meniscus tears (the second most common structure damaged in athletes)
• - shoulder dislocation
• - patellar dislocation
• - ankle instability (the most commonly injured joint in the body)

7.Osteoarthritis in Young, Active, and Athletic Individuals. *Adae O Amoako(2018)*[10]

This study concludes several risk factors associated with OA. In the athlete or young individual, injury, occupational activities, and obesity are the main factors that contribute to OA. Diagnosis of OA in the athlete is often delayed and difficult

because of high tolerance to pain, as well as the athlete's preference for expedited return to play. History, physical examination, laboratory tests, and radiographic findings may be used to make a definite diagnosis of OA. Exercise remains the recommended initial treatment for OA in all populations. NSAIDs, braces, and surgery are other treatment modalities for OA. The treatment of OA in the athlete or young individual should be patient specific, with consideration for the patient's expectations and the period of absence from sports activities.

8. Workplace policies and prevalence of knee osteoarthritis: the Johnston County Osteoarthritis Project. J-C Chen, L Linnan, L F Callahan, E H Yelin, and J B Renner, J M Jordan [2007 Jun 13]

The negative associations between KOA and workplace policies raise concerns about possible employment discrimination or beneficial effects of workplace policies.

Longitudinal studies are needed to clarify the dynamic complexities of KOA risks and outcomes in relation to workplace policies.

Studies on the interrelations of work and osteoarthritis (OA) remain an active area of research because of their profound implications for clinical practice and public policy. As indicated in recent reviews of epidemiological literature on the relationship between occupational factors and risks of knee OA (KOA),[1,2] both case–control and prospective cohort studies have shown the positive associations between KOA and physical exposures in the workplace, and the strength of scientific evidence is moderate.

Specifically, previous studies have shown that certain occupational activities (e.g., kneeling, squatting or climbing) increase the risk of KOA,[3,4,5,6] presumably due to increased biomechanical loads on knee joints.

However, most of the previous studies were primarily focused on individual-level attributes; very little data are available to examine the potential link between KOA and organisation-level workplace characteristics (e.g., workplace policies, employers' commitment), many of which play an important role in occupational health and safety.

HYPOTHESIS

NULL HYPOTHESIS :

There's no correlation find between knee OA and young people (Age between 21 to 30 years) having prolonged sitting or standing work profession. That's why prevalence rate is difficult to find and result is not significant.

RESEARCH HYPOTHESIS :

There's some correlation find between knee OA and young people (Age between 21 to 30 years) having prolonged sitting or standing work profession. Hens prevalence

rate can be find and significance can be find through this research.

METHODOLOGY

MATERIALS AND METHODOLOGY :-

STUDY DESIGN : Cross-sectional study

SOURCE OF DATA : Hospitals and Offices

POPULATION : Young Working professionals having age between 21 to 30 years who have prolonged sitting or standing work profession.

SAMPLING METHOD : Convenient Sampling Method

DURATION OF STUDY : 1 month

SAMPLE SIZE : 100

•Method of selection of data:

Research will be conducted on young people age between 21 to 30 years having prolonged standing or sitting work profession. An observational study was conducted by using the convenient sample method. One hundred working professionals of ahmedabad and nearby area participated in this study by perform validated assessment form and clinical measures.

• *INCLUSION CRITERIA*

• Subject having age between 21 to 30 Years.

• Both male and female subject.

• Subject who having prolonged sitting or standing work profession (Ex: Nurse, Teacher/Professor, Petrol filler man).

• *EXCLUSION CRITERIA*

• Subject having diabetes, hyperthyroidism, hypertension, osteoporosis, rickets and various type of muscular disorders.

• Subject having autoimmune disease.

• Subject with previous history OA surgery.

• Subject with history of any other neurological and cardio-thoracic conditions.

• Subject having OA of hip, wrist or hand and feet.

• OUTCOME MEASURES

• Clinical assessment forms

• Patient's X-ray, and other radiological reports

• Clinical Measures

• Excel sheet

• The Visual Analogue WOMAC 3.0 scale & VAS scale

• Goniometer

RESULT :

PROCEDURE OF RESEARCH:

Survey of the working professionals

Data collection by using the questionnaire

Data analysis

Data Interpretation

Result

Conclusion

A sum of 100 working professionals responded answering the questionnaire. An analysis was done by excel & calculation was done by chi square test calculator. The chi- square statistics found as 0.1695. The p value is 0.918761. The result is not significant at $p < .01$.

RESULTS			
	NONE	MILD	MODERATE
MALE	42 (41.80) [0.00]	1 (1.32) [0.08]	1 (0.88) [0.02]
FEMALE	53 (53.20) [0.00]	2 (1.68) [0.06]	1 (1.12) [0.01]

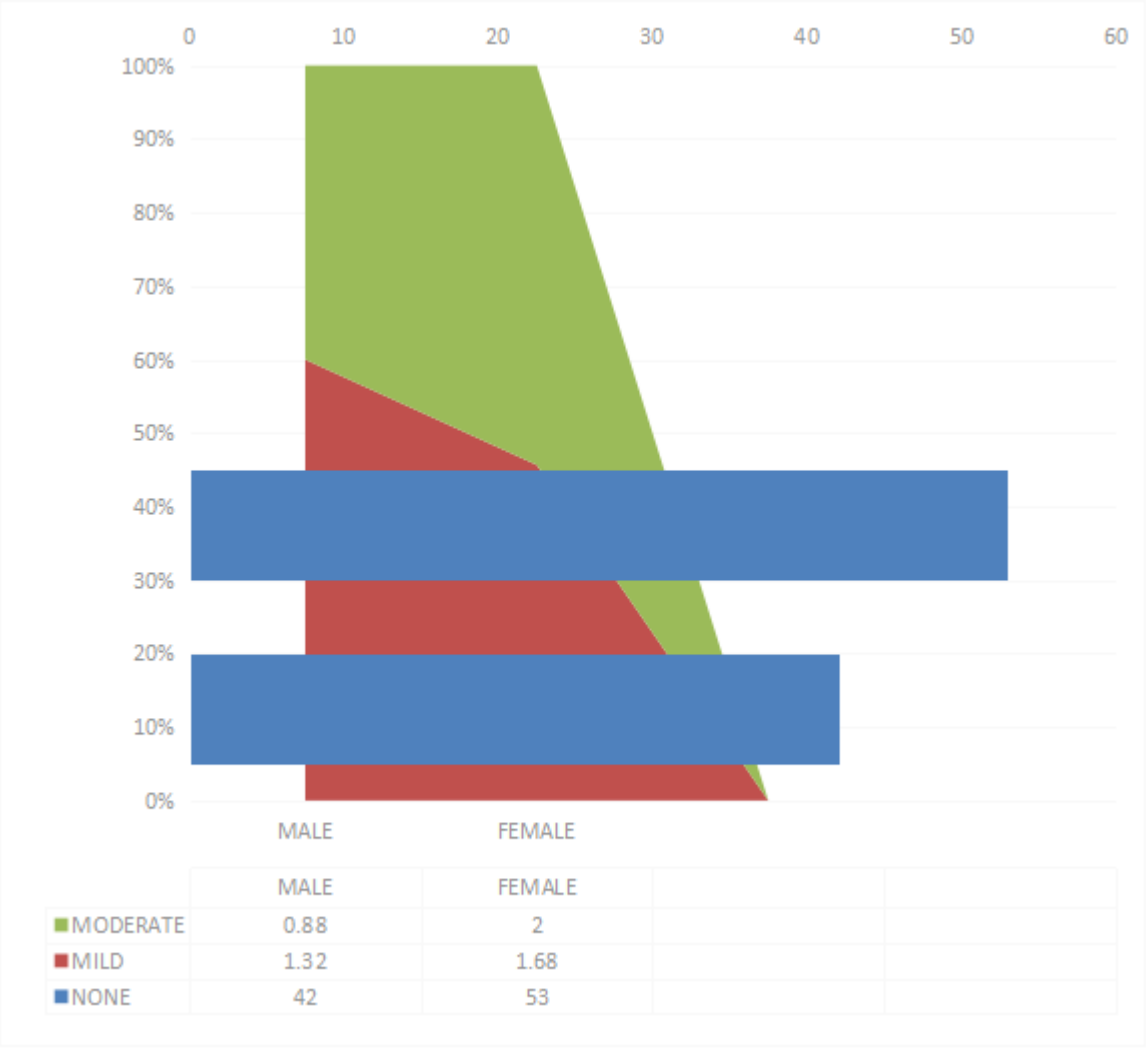
1.1 RESULT TABLE WITH P VALUE AND CHI SQUARE DATA

The prevalence of OA varies according to the definition of OA, the specific joint(s) under study, and the characteristics of the study population. The age standardized prevalence of radiographic knee OA in given subjects age between 21-30 years was only 5% among the all participants. Out of 100 subjects only 5 subjects primarily suspected of having OA of knee. Out of 100 subjects there was 56 female and 44 male subject in this survey. And OA was found in 3 female and 2 male subject after assessing clinical measures.

So, the prevalence percentage of OA of knee in young people age between 21 to 30 years having prolonged sitting or standing work profession would be as below:

Prevalence percentage = OA will be found for given Criteria **DEVIDED BY** OA Will be not found for given criteria **INTO 100%**

TOTAL PREVALENCE PERCENTAGE = **5.2631%**
PREVALANCE PERCENTAGE IN MALES = **2.10%**
PREVALANCE PERCENTAGE IN FEMALES = **3.15%**



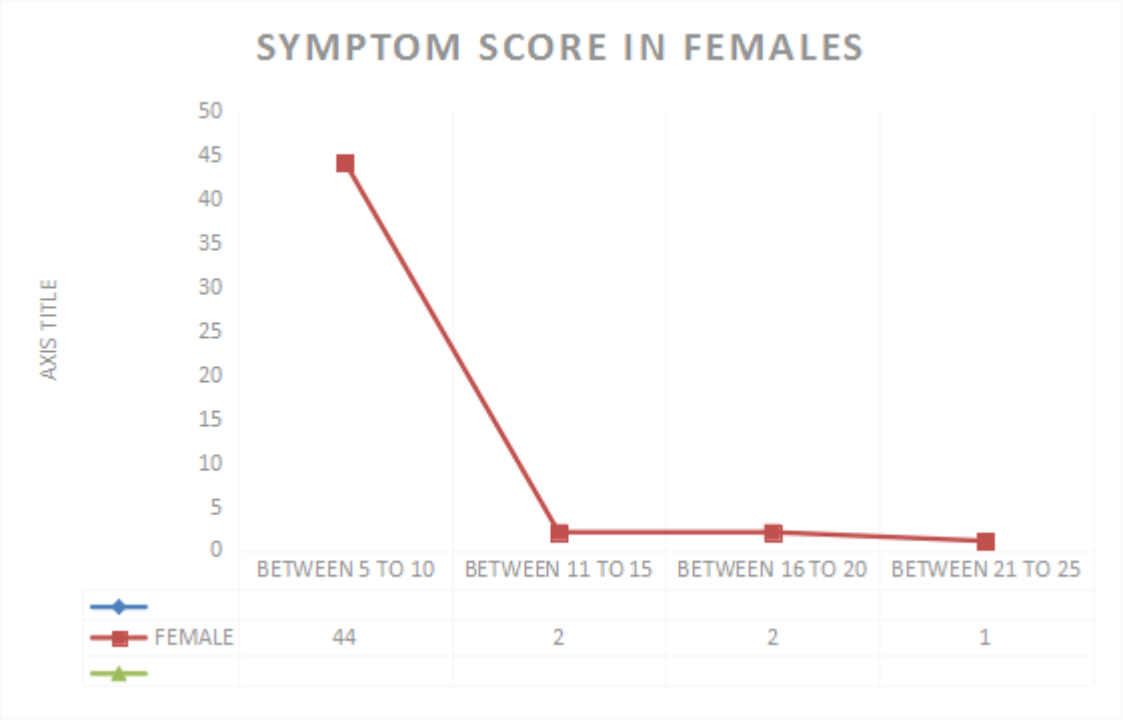
	MALE	FEMALE
MODERATE	0.88	2
MILD	1.32	1.68
NONE	42	53

GRAPH 1.1 CHI SQUARE

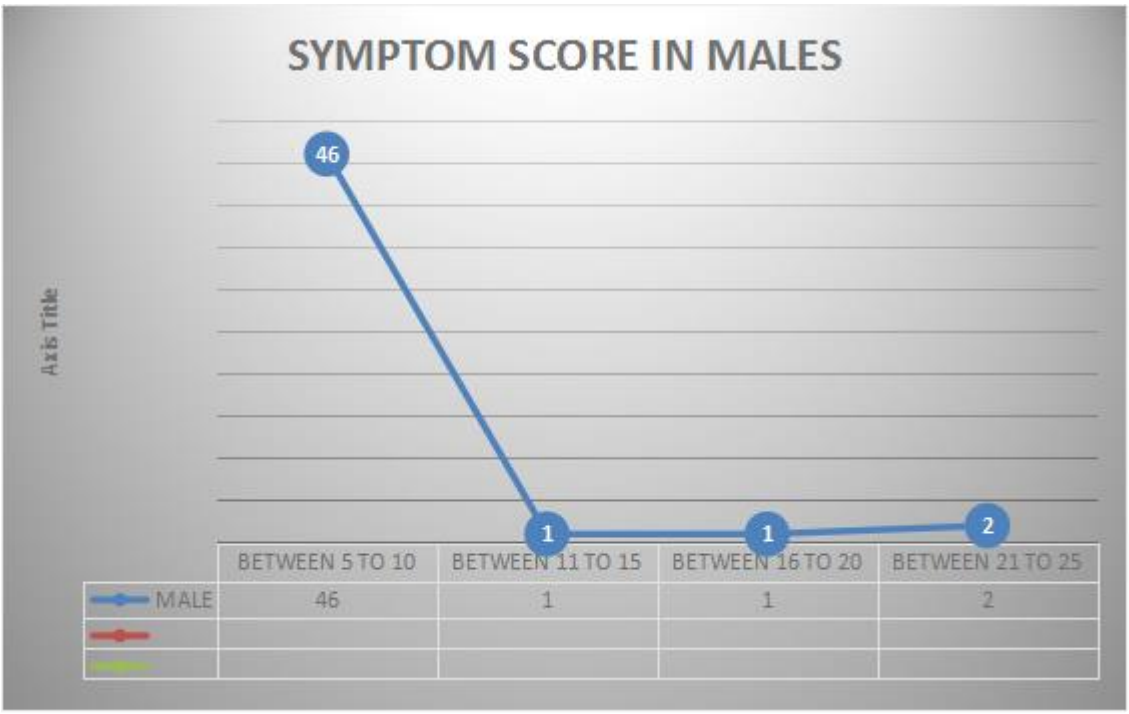
➡ *CHI SQUARE STATISTICS WITH PREVALANCE DATA*

A chi-squared test (also chi-square or χ^2 test) is a statistical hypothesis test that is valid to perform when the test statistic is chi-squared distributed under the null hypothesis, specifically Pearson's chi-squared test and variants thereof. Pearson's chi-squared test is used to determine whether there is a statistically significant difference between the expected frequencies and the observed frequencies in one or more categories of a contingency table.

Symptoms - These questions should be answered thinking of your knee symptoms during the **last week**

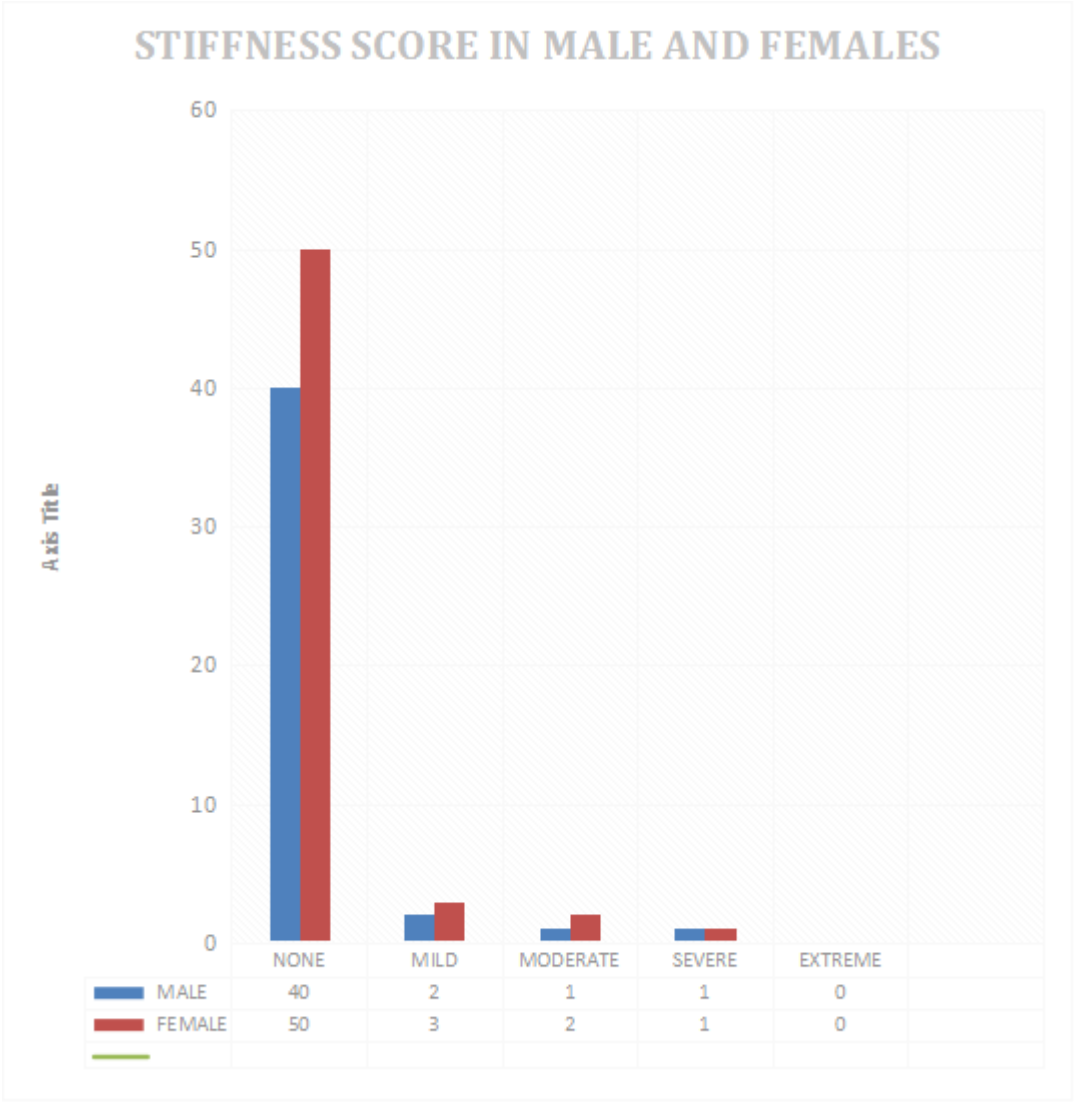


GRAPH 1.2

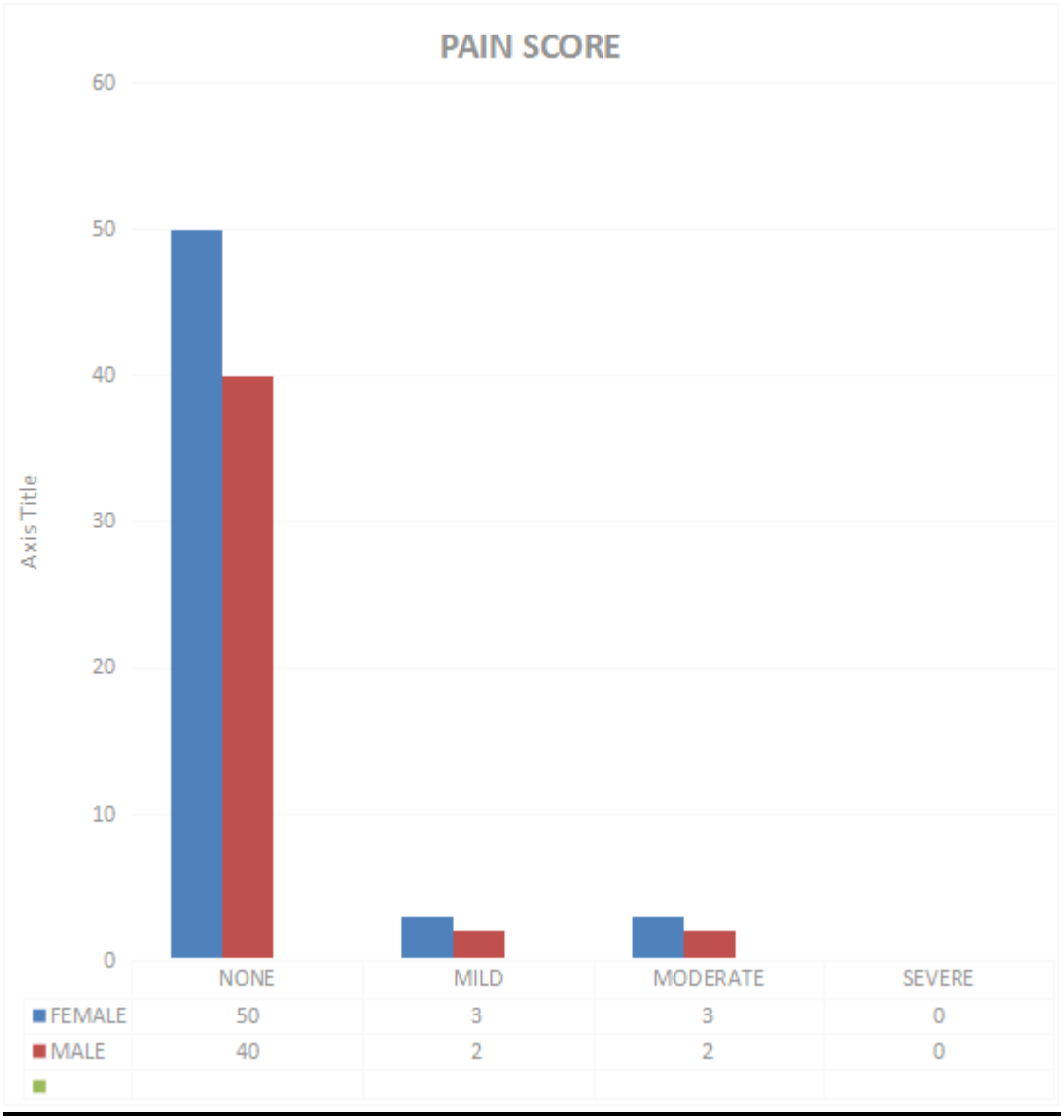


GRAPH 1.3

Stiffness - The following questions concern the amount of joint stiffness you have experienced during the **last week** in your knee. Stiffness is a sensation of restriction or slowness in the ease with which you move your knee joint.

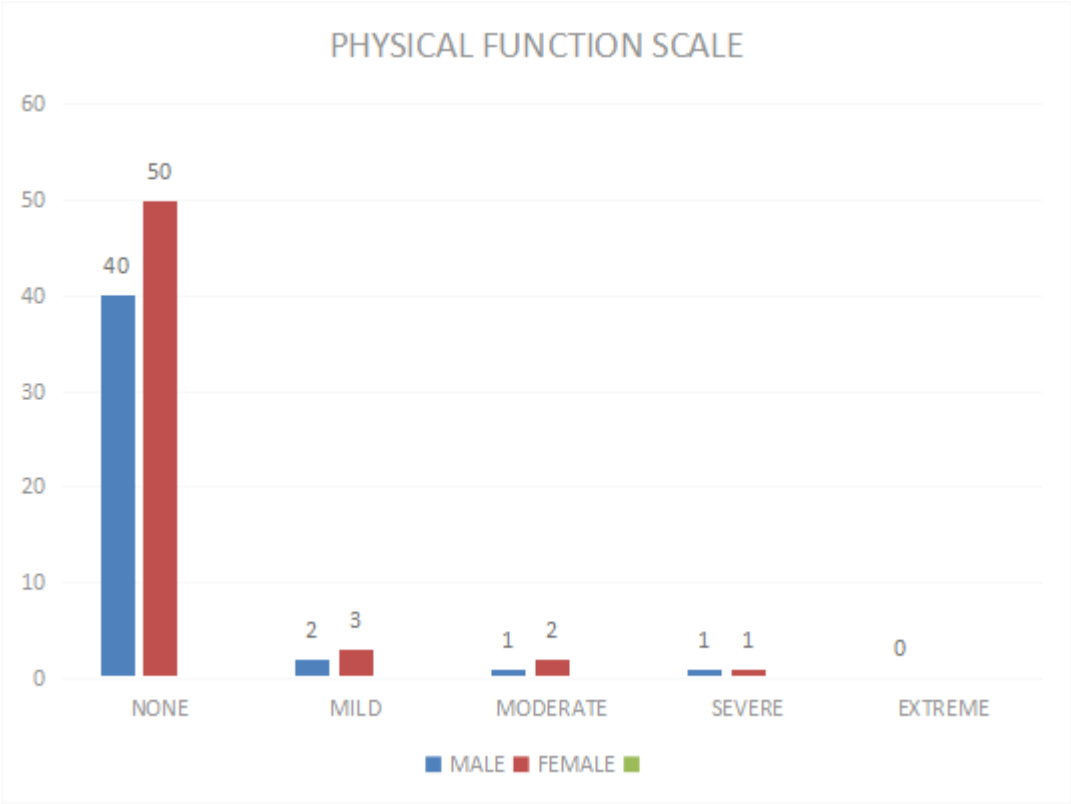


GRAPH 1.4


PAIN SCORE
60
50
40
30
20
10
0
Axis Title
NONE
MILD
MODERATE
SEVERE
FEMALE 50 3 3 0
MALE 40 2 2 0

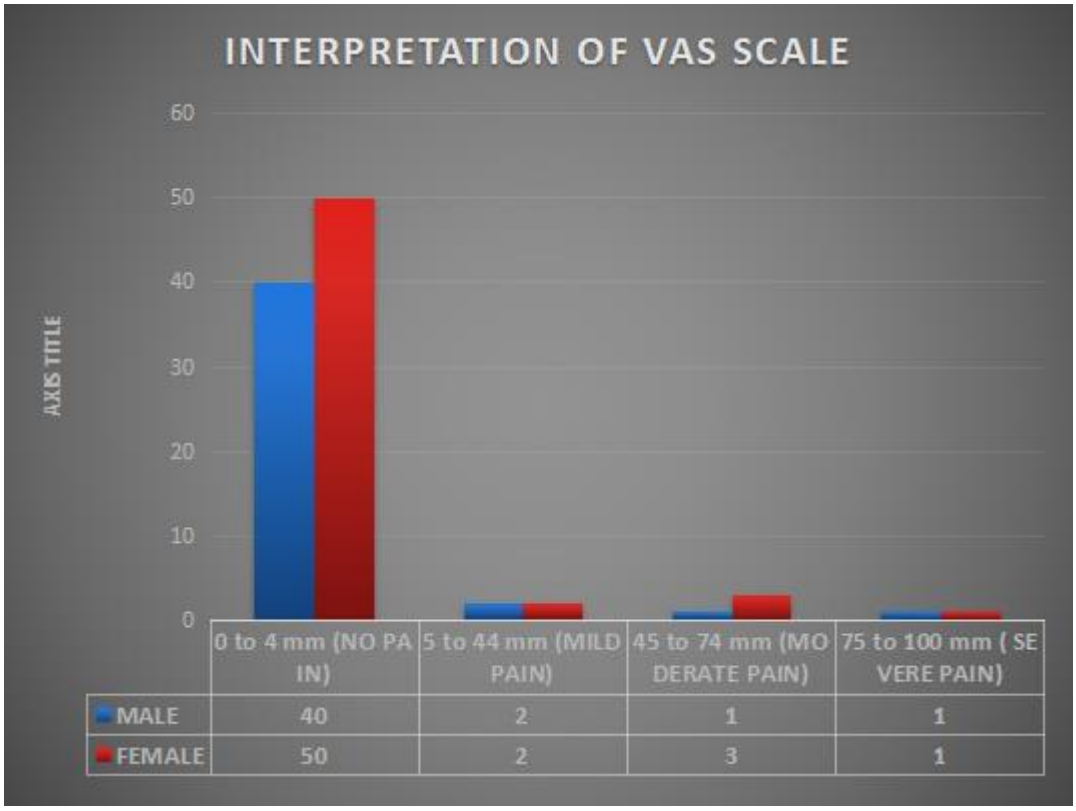
GRAPH 1.4

Function, daily living - The following questions concern your physical function. By this we mean your ability to move around and to look after yourself. For each of the following activities please indicate the degree of difficulty you have experienced in the last week due to your knee



GRAPH 1.5

VAS SCALE RESULTS



GRAPH 1.7

DISCUSSION :

The present study was carried out to find prevalence of osteoarthritis in young people (Age between 21 to 30 years) having prolonged sitting and standing profession. This study was performed in the ahmedabad and nearby areas. any damage to the joints cannot be reversed, the symptoms of osteoarthritis can be managed, allowing sufferers to live as normal a life as possible.

Treatments for osteoarthritis include lifestyle advice, medications, orthobiologics and surgery.

Lifestyle changes include taking steps to lose weight if necessary and doing low impact exercise, such as yoga, to help strengthen muscles around the joint to stabilise it. Your doctor may refer you to a physiotherapist if your job or choice of physical activity is causing your symptoms. They may also recommend topical treatments or the use of hot or cold compresses.

Osteoarthritis typically affects people over the age of 50, but young people can be affected as well.[2] The CDC estimates that about 7% of the U.S. population aged 18–44 had been diagnosed with OA from 2013–2015.

Younger people who are active in sports or other physically demanding activities, or who have sustained an injury such as a torn meniscus—a tear in the cartilage of the knee—may be more prone to developing the condition earlier in life.

Over 32 million people across the U.S. live with osteoarthritis.[3] While this condition can affect any joint, it typically affects the knees, hips, back, hands, and neck. Symptoms such as pain or swelling may not occur right away and can worsen over time.

This study was conducted to find the prevalence of osteoarthritis of knee in young people age between 21 to 30 years having sitting or standing work profession. The purpose of the study was to find prevalence ratio of OA in young people. Osteoarthritis (OA) is defined as a heterogeneous group of conditions that lead to joint symptoms and signs associated with a defective articular cartilage and related changes in bone morphology. It is considered the most common type of arthritis, as well as one of the most significant health problems that pervades our modern world. In 2019, it was estimated that 43 million adults suffered from arthritis. Of those, 26.9 million adults aged 25 years or older had OA. One in four people is expected to develop symptomatic OA in his or her lifetime.

SUMMARY & CONCLUSION

The prevalence of OA varies according to the definition of OA, the specific joint(s) under study, and the characteristics of the study population. The age standardized prevalence of radiographic knee OA in given subjects age between 21-30 years was only 5% among the all participants. Out of 100 subjects only 5 subjects primarily suspected of having OA of knee. Out of 100 subjects there was 56 female and 44 male subject in this survey. And OA was found in 3 female and 2 male subject after assessing clinical measures.

A sum of 100 working professionals responded answering the questionnaire. An analysis was done by excel & calculation was done by chi square test calculator. The chi- square statistics found as 0.1695. The p value is 0.918761. The result is not significant at $p < .01$.

This study concludes that prevalence of osteoarthritis is very less in young working professionals that's why we can conclude that young people is not very prone for OA.
But there are some potential chances for having OA is present like lifestyle, genetic factors and other factors that can cause OA in young age.

LIMITATION & FUTURE RECOMMENDATION

1. Small sample size.
2. Limited research area.
3. The self selection and convenient sampling of participates to complete the study may also influence the result.
4. Very limited access to clinical measures.
5. Very small subject group.

FUTURE RECOMMENDATION

- Future research should replicate these findings in other large samples , take larger age groups to find most accurate prevalence of OA in young working professionals.

LIST OF REFFERENCES

1. Altman R, Asch E, Bloch D, et al. Development of criteria for the classification and reporting of osteoarthritis of the knee. Arthritis Rheum. 1986;29:1039–49. [PubMed] [Google Scholar]

2. Kopec JA, Rahman MM, Berthelot JM, et al. Descriptive epidemiology of osteoarthritis in British Columbia, Canada. J Rheumatol. 2007;34:386–93. [PubMed] [Google Scholar]

3. Yelin E, Murphy L, Cisternas MG, Foreman AJ, Pasta DJ, Helmick CG. Medical care expenditures and earnings losses among persons with arthritis and other rheumatic condition in 2003, and comparisons with 1997. Arthritis Rheum. 2007;56:1397–407. [PMC free article] [PubMed] [Google Scholar]

4. Lethbridge-Cejku M, Schiller JS, Bernadel L. Summary health statistics for U.S. adults: National Health Interview Survey, 2002. Vital Health Stat. 2004;10:1–51. [PubMed] [Google Scholar]

5. Lawrence RC, Felson DT, Helmick CG, et al. Estimates of the prevalence of arthritis and other rheumatic conditions in the United States. Part II. Arthritis Rheum. 2008;58:26–35. [PMC free article] [PubMed] [Google Scholar]

6. Murphy LB, Helmick CG, Schwartz TA, et al. One in four people may develop symptomatic hip osteoarthritis in his or her lifetime. Osteoarthritis Cartilage. 2010;18:1372–9. [PMC free article] [PubMed] [Google Scholar]

7. Murphy L, Schwartz TA, Helmick CG, et al. Lifetime risk of symptomatic knee osteoarthritis. Arthritis Rheum. 2008;59:1207–13. [PMC free article] [PubMed] [Google Scholar]

8. Lau EC, Cooper C, Lam D, Chan VN, Tsang KK, Sham A. Factors associated with osteoarthritis of the hip and knee in Hong Kong Chinese: obesity, joint injury, and occupational activities. Am J Epidemiol. 2000;152:855–62. [PubMed] [Google Scholar]

9. Jordan JM, Helmick CG, Renner JB, et al. Prevalence of knee symptoms and radiographic and symptomatic knee osteoarthritis in African Americans and Caucasians: the Johnston County Osteoarthritis Project. J Rheumatol. 2007;34:172–80. [PubMed] [Google Scholar]

10. Cameron KL, Hsiao MS, Owens BD, Burks R, Svoboda SJ. Incidence of physician-diagnosed osteoarthritis among active duty United States military service members. Arthritis Rheum. 2011;63:2974–82. [PubMed] [Google Scholar]

11. Levangie PK, Norkin CC, editors. Joint Structure and Function: A Comprehensive Analysis. 3rd ed. Philadelphia: FA Davis; 2005. p. 80. [Google Scholar]

12. Buckwalter JA, Mankin HJ. Articular cartilage. Part 1: tissue design and chondrocyte-matrix interactions. J Bone Joint Surg. 1997;79:600–11. [Google Scholar]

13. Buckwalter JA, Lane NE. Athletics and osteoarthritis. Am J Sports Med. 1997;25:873–81. [PubMed] [Google Scholar]

13. Buckwalter JA, Lane NE. Athletics and osteoarthritis. Am J Sports Med. 1997;25:873–81. [PubMed] [Google Scholar]

14. Rall KL, McElroy GL, Keats TE. A study of long term effects of football injury to the knee. Mo Med. 1964;61:435–8. [PubMed] [Google Scholar]

15. Kujala UM, Kettunen J, Paananen H, et al. Knee osteoarthritis in former runners, soccer players, weight lifters, and shooters. Arthritis Rheum. 1995;38:539–46. [PubMed] [Google Scholar]

16. Tveit M, Rosengren BE, Nilsson JÅ, Karlsson MK. Former male elite athletes have a higher prevalence of osteoarthritis and arthroplasty in the hip and knee than expected. Am J Sports Med. 2012;40:527–33. [PubMed] [Google Scholar]

17. Repo RU, Finlay JB. Survival of articular cartilage after controlled impact. J Bone Joint Surg. 1977;59:1068–76. [PubMed] [Google Scholar]

ANNEXURE A

Clinician's name (or ref) **Patient's d.o.b :**

INSTRUCTIONS: This survey asks for your view about your knee. This information will help us keep track of how you feel about your knee and how well you are able to do your usual activities.

Answer every question by ticking the appropriate box. If you are unsure about how to answer a question, please give the best answer you can.

Symptoms - These questions should be answered thinking of your knee symptoms during the **last week.**

S1. Do you have swelling in your knee?

○ Never ○ Rarely ○ Sometimes ○ Often ○ Always

S2. Do you feel grinding, hear clicking or any other type of noise when your knee moves?

○ Never ○ Rarely ○ Sometimes ○ Often ○ Always

S3. Does your knee catch or hang up when moving?

○ Never ○ Rarely ○ Sometimes ○ Often ○ Always

S4. Can you straighten your knee fully?

○ Never ○ Rarely ○ Sometimes ○ Often ○ Always

S5. Can you bend your knee fully?

○ Never ○ Rarely ○ Sometimes ○ Often ○ Always

Stiffness - The following questions concern the amount of joint stiffness you have experienced during the **last week** in your knee. Stiffness is a sensation of restriction or slowness in the ease with which you move your knee joint.

S6. How severe is your knee joint stiffness after first wakening in the morning?

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

S7. How severe is your knee stiffness after sitting, lying or resting **later in the day?**

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

Pain[1]

P1. How often do you experience knee pain?

○ Never ○ Monthly ○ Weekly ○ Daily ○ Always

What amount of knee pain have you experienced the **last week** during the following activities?

P2. Twisting/pivoting on your knee

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

P3. Straightening knee fully

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

P4. Bending knee fully

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

P5. Walking on flat surface

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

P6. Going up or down stairs

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

P7. At night while in bed

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

P8. Sitting or lying

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

P9. Standing upright

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

Function, daily living - The following questions concern your physical function. By this we mean your ability to move around and to look after yourself. For each of the following activities please indicate the degree of difficulty you have experienced in the **last week** due to your knee.

Al. Descending stairs

None Mild Moderate Severe Extreme

A2. Ascending stairs

None Mild Moderate Severe Extreme

For each of the following activities please indicate the degree of difficulty you have experienced in the **last week** due to your knee.

A3. Rising from sitting

None Mild Moderate Severe Extreme

A4. Standing

None Mild Moderate Severe Extreme

A5. Bending to floor/pick up an object

None Mild Moderate Severe Extreme

A6. Walking on flat surface

None Mild Moderate Severe Extreme

A7. Getting in/out of car

None Mild Moderate Severe Extreme

A8. Going shopping

None Mild Moderate Severe Extreme

A9. Putting on socks/stockings

None Mild Moderate Severe Extreme

A10. Rising from bed

None Mild Moderate Severe Extreme

A11. Taking off socks/stockings

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

A12. Lying in bed (turning over, maintaining knee position)

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

A13. Getting in/out of bath

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

A14. Sitting

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

A15. Getting on/off toilet

○ None ○ Mild ○ Moderate ○ Severe ○ Extreme

For each of the following activities please indicate the degree of difficulty you have experienced in the **last week** due to your knee

A16. Heavy domestic duties (moving heavy boxes, scrubbing floors, etc)

○ Never ○ Rarely ○ Sometimes ○ Often ○ Always

A17. Light domestic duties (cooking, dusting, etc)

○ Never ○ Rarely ○ Sometimes ○ Often ○ Always

Thank you very much for completing all the questions in this questionnaire.