Is Sports Participation Associated with the Knee Osteoarthritis?

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ABSTRACT
Background: Osteoarthritis is affecting most of the population globally and knee osteoarthritis is the most common joint of the body getting involved. People nowadays are becoming fitness freaks, but without proper planning of fitness protocols and food habits, they end up with knee osteoarthritis. So, aiming to find out the prevalence of knee osteoarthritis in the growing society will help in improving the lives of human beings and make them perform well in daily life and on the field.
Methodology: An observational descriptive analytic study, the target population was sports and non-sports individuals.
Results: Sports individuals had a 6.52% KOA prevalence which (43.75% - males) and (56.25% - females). Non-sports individuals had 14.87% of KOA prevalence, of which (45.34% - males) and (54.65% - females).
Conclusion: There was a high prevalence of knee osteoarthritis in non-sports individuals as compared to sports individuals and higher in females than males.

1. Introduction

Osteoarthritis affects all tissues of the joint, in knee osteoarthritis (KOA) the chondrocytes are directly affected at the cellular level and these cells are responsible for the remodelling (synthesis-degradation) of extracellular matrix [1]. This causes changes at the molecular level leading to damage of articular cartilage, bone, and soft tissues of the joint also there is the formation of osteophytes and cysts. Ultimately, there is the appearance of main symptoms of Osteoarthritis like pain, local inflammation, joint deformation, and disability.

There is repeated eccentric contractions of muscles during running, football, or any other aerobic exercise performance [2,3], and repeated concentric contractions in cycling. During eccentric sports such as football or basketball, characteristic movements performed by players, like sprints and repeated jumps, result in muscle damage due to the great effort from joints and muscles [2,4]. Osteoarthritis is characterized by subchondral osteophytic bone proliferation, and progressive deterioration of articular cartilage which leads to pain, limited mobility, disability, and deterioration of the patient's quality of life, also presently there is no established treatment for OA [5].

Osteoarthritis has different sets of factors associated with its incidence and that's why it has a multi-factorial etiology [6,8] Personal-level & joint-level are the two broadly divided factors [7]. Personal-level factors are Age, sex, obesity, genetics, race/ethnicity, and diet. Injury, activity, type of occupation, and muscle strength are the joint-level factors that are unique to a particular joint. Doherty [9], reported that weight status and dietary factors may play a role in its progression, and recreational activity can play a role in the development of KOA.

Apart from sports, unhealthy lifestyles work type, nature of activity, and maladapted posture can also be associated risk factors for developing KOA in the individuals. The study's objectives were: To determine and compare the prevalence of KOA in sports and non-sports individuals. This will help our society to spread awareness, reduce the risk of occurrence of KOA, and improve their existence in life.

2. Methodology

This study focused on the survey to find out the occurrence of KOA in sports and non-sports individuals, the research design was an observational descriptive analytic study, target population the Individuals coming to the gyms, sports clubs, hospitals, and institutions, irrespective of their job profile and from various community set up and workplaces with the age group of 25-50 years, outcome measure a structured questionnaire. The screening of the population was done through a structured questionnaire which was validated by the expert and the screening of KOA was done using the clinical American College of Rheumatology (ACR) criteria for KOA.

Based on the inclusion and exclusion criteria the individuals were included in the study and divided into sports and non-sport individuals wherein they were further screened for KOA using clinical ACR criteria.

Inclusion criteria: Participants with ages > 25 to 50 years of both genders and the participants fulfilling the clinical American College of Rheumatology (ACR) criteria for KOA. ACR criteria for KOA [10] inference drawn from, KOA present if the following items 1, 2, 3, 4, or 1, 2, 5 or 1, 4, 5 are present. (1) Knee pain for most days of the prior month, (2) Crepitus on active joint motion, (3) Morning stiffness < 30 min in duration, (4) Age > 38 years, (5) Bony enlargement of the knee on examination. **Exclusion criteria:** Individuals who had a joint replacement surgery, have a history of meniscal or other knee surgery in the past 6 months, past/previous history of fractures at the knee joint, have deformity at lower limb, osteoporosis, neurological deficits, COVID-19 symptoms, and pregnant females.

General Procedure: Permission was obtained from the Ethical Committee, the Respected Supervisor, and the Guide of Meenakshi Academy of Higher Education & Research (MAHER) Chennai for conducting the research. After obtaining the consent, followed by explaining the individuals regarding the nature of the study and fulfilling the inclusion criteria, the structured questionnaire was recorded. The collected data was tabulated in the Master chart and analyzed for the results.

3. Statistical Analysis

Descriptive statistics were used and values were expressed in numbers and percentages. Quantitative data was represented in figures and tables. The prevalence ratio was calculated by a 2 X 2 contingency table. The difference was considered statistically significant if the 95% Cl for prevalence ratios included 1.

4. Results

The prevalence of KOA was calculated for 5514 individuals as per the division into sports and non-sports individuals. A total of 5514 individuals participated in the study, of which 2698 were sports and 2816 were non-sports individuals.

Out of 2698, 176 had KOA with a prevalence of 6.52% (sports). Of the 2816 participants, 419 had KOA having a prevalence of 14.87% (non-sports). Thus, the prevalence of KOA is higher in non-sports individuals than in sports individuals (Figure 1).

Among (sports individuals) 176 had KOA, 77 were males i.e. 43.75%, and 99 were females i.e. 56.25% (Figure 2).

Of the (non-sports individuals) 419 who had KOA, 190 were males i.e. 45.34% and 229 were females i.e. 54.65% (Figure 3).

Thus in both sports and non-sports individuals, the prevalence of KOA was found to be higher in females than in males.

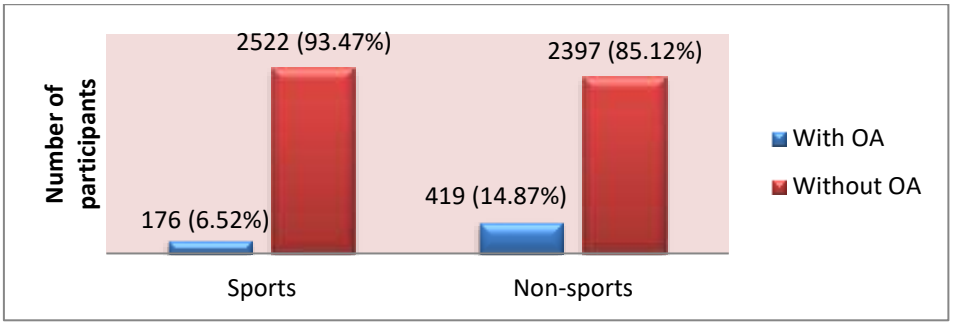

Fig.1: Prevalence of OA in sports and non-sports individuals

Prevalence Ratio: It is calculated to measure the strength of association of KOA between sports and non-sports.

Table 1: Prevalence ratio of KOA between sports Vs. non-sports

	With KOA	Total subjects	Prevalence
Non-Sports	419	2816	14.87
Sports	176	2698	6.52
Prevalence Ratio = (419/2816) / (176/2698) = **2.28** 95% CI: 1.89 to 2.74			

From the above table, it can be interpreted that the prevalence of KOA in non-sports individuals is 2.28 folds greater than in sports individuals.

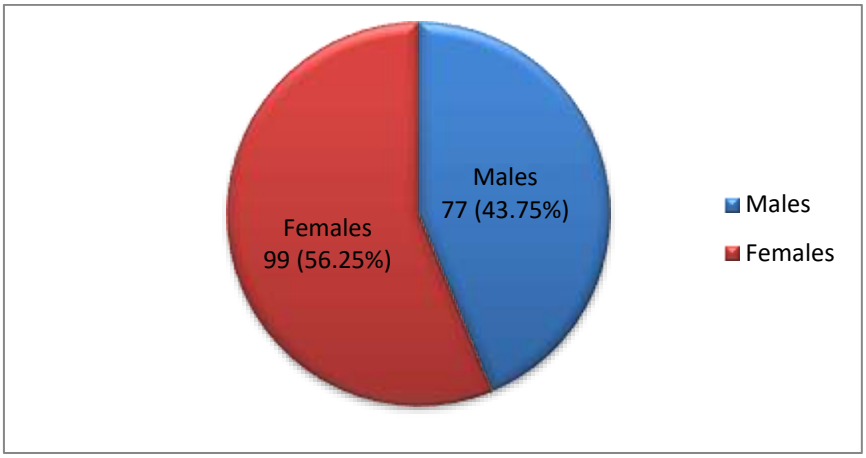

Fig.2: Number of males and females among sports individuals having KOA (n=176)

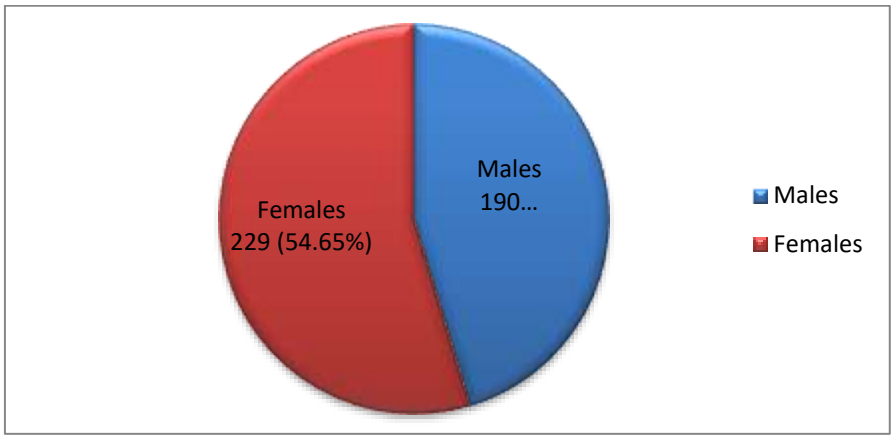

Fig.3: Number of males and females among non-sports individuals having KOA (n=419)

5. Discussion

This study investigated the prevalence of KOA among sports and non-sports individuals ranging from the age group of 25 to 50 years of 5514 individuals.

For this study, we used the term “Sports individuals” to describe someone who is physically active and is regularly involved in sports or leisure activity, and the “Non-Sports individuals” refers to individuals with a sedentary lifestyle who are not physically active.

The (sports individuals) had a lower prevalence of KOA i.e. 6.52% maybe because of the correct posture, exercises, and diet which could be most probably preventing excessive loading on the articulating surfaces of the femur, tibia, and patella, good musculoskeletal strength around the knee in the quadriceps, hamstrings, hip, abdomen, back and pelvis complex muscles and the use of assistive devices such as orthotic braces for knee and lower limb during sporting. This leads to ergonomically better working of internal musculoskeletal systems of the knee joint to function normally.

The (non-sports individuals) had a prevalence of 14.87%, the results obtained in this study are near to the study done by Cui, A.; [11] having 19.8% prevalence. The non-sports individuals had a higher prevalence of 14.87%, which could be due to maladapted posture, lack of regular physical exercises, no proper precautions, care of the body, and knee joints, and improper diet habits. It can be interpreted that the prevalence of KOA in non-sports individuals is 2.28 folds greater than in sports individuals in the present study. To reduce the prevalence of KOA the strategies at work place to be designed and incorporated. Exercise programs by physiotherapy experts and a nutritious diet need to be implemented to decrease the occurrence of KOA.

Among (sports individuals) males had 43.75% and (females 56.25%) of KOA. And in (non-sports individuals)

males had 45.34% and (females 54.65%) of KOA, thus in both sports and non-sports individuals, the prevalence of KOA was found to be higher in females than in males. In the study [12-16], it is interestingly observed that women are more affected and burdened by KOA than men. There are several studies showing females have an increasing trend for KOA, which is likely to be due to anatomic, body composition, kinematic differences, and hormonal factors [17].

The strong risk factors for developing KOA are knee injuries like ligament ruptures, meniscal tears, and fractures [18,21,23-24]. In certain situations, like increased knee loading related to sprinting, squatting, cutting, and pivoting during the sports, abrupt changes of direction, and the type of impact. This is shown by the sensitivity analyses and accordingly explains how the difference in the prevalence of KOA varies with the different types of sports [19,20].

The present study demonstrated that there is a prevalence of KOA in sports individuals that is 6.52% between the age group of 25-50 years which shows that this could be the initial stage of the beginning of KOA where further degeneration will progress. A study done by Fernanda O. Madalenoa, et. al. on former athletes got a mean 30.0% prevalence of KOA, this shows that athletes and sports individuals later develop serious degenerative disorders and this population is at higher risk of developing KOA [25].

Involving in sports develops increased muscle strength and better joint proprioception, suggesting joint protectiveness [22,27] This develops during sports participation and increases the athletes pain threshold miraculously [22,26], hence as the radiographic KOA begins in these masses they present a late clinical diagnosis of KOA [26].

Thus, by considering the prevalence of KOA in sports and non-sports individuals in the age group of 25-50 years. The non-sports and sports professionals, and organizations can adopt precautionary strategies during and after the professional tenure of athletes, it may reduce disabilities associated with and the prevalence of KOA [28]. Therefore, the occurrence of KOA and its impact on life and socioeconomic condition can be reduced by public awareness in the form of knowledge enlightenment programs concerning the preservation of wellness, healthy diet, use of assistive devices for the body or joints under stress, and properly planned exercises.

6. Conclusion

The study concluded that there was a high prevalence of KOA in the non-sports as compared to the sports individuals. Also, the prevalence was found to be higher in females than in males.

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Future Scope:

Future studies can be performed on specific sports, criteria of number of years involved in sports, time of exposure to sport, different types of sports, and previous knee injuries.

Conflict Of Interest:

The Authors declare that there is no conflict of interest.

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