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# Frequency and Risk Factors of Knee Osteoarthritis (KOA) in Hayatabad Peshawar, Pakistan

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**Author`s Contribution**

*[1 2 3 4 5] Substantial contributions to the conception or design of the work for the acquisition, analysis or interpretation of data for the work, [3 6] Drafting the work or reviewing it critically for important intellectual content, [1 2 4] Final approval of the version to be published, [1 2 3 4 5, 6] Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.*

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## ABSTRACT

Background: Osteoarthritis (OA) is one of the most common degenerative joint diseases. The progression of this disease is slow and with increasing age, it leads to joint dysfunction with pain, affects quality of life, and causes disability. OA of the knees can lead to loss of functional mobility and presents as a great burden to the community.

Objectives: The main objective and aim of the study were to identify the frequency and related risk factors of Knee Osteoarthritis (KOA) in residents of Hayatabad Peshawar, and find a correlation to different aspects e.g., Sex, BMI, Age, etc.

Methodology: A descriptive cross-sectional study was conducted in Hayatabad Peshawar from October 2020 to April 2021. Inclusion criteria were people over the age of 40, male and female, residents of Hayatabad. Exclusion criteria were patients suffering from trauma, poliomyelitis, rheumatoid arthritis, malignancy, and knee surgeries. Self-reported questionnaire that focused on the diagnosis of Knee Osteoarthritis and Associated Risk factors was used and data was collected from 409 residents who willingly participated in the study. The data was later analyzed using SPSS version 24.

Results: Among 409 participants 167 (40.83%) were suffering from knee Osteoarthritis. 75 (30.6%) of male and 92(56.1%) of female were suffering from KOA. Regarding risk factors aged>40 and obese participants were more prone to KOA than others such as age <40 and normal BMI.

Conclusion: KOA is a degenerative joint age-related disease that commonly affects females. Obesity shows a strong link in the development of KOA especially in those who are inactive. There is a significant relationship between KOA with age, BMI, and gender therefore proper attention and preventive measures should be taken into consideration.

Keywords: Knee Osteoarthritis, Frequency, risk factors, Hayatabad, Peshawar.

## Introduction

One of the most common recurrent degenerative joint disorders in the world is Knee Osteoarthritis (KOA)[1]. KOA is one of the most common prevalent age-related health problems in the society. In a primary health care setting 10% of indoor patients who complained of knee pain were diagnosed with KOA and 30% of outdoor patients.[2] A study conducted in Pakistan has shown that 25% of rural and 28%of urban areas population suffer from knee osteoarthritis (KOA).[3] Another study was conducted in Bahawalpur, Pakistan which found that out of 72 KO patients, 52 were female and 20 were male revealing that gender is a potential factor in developing KO.[4] There were many other factors involved in the development of KOA including heredity factors, excessive pressure on joints, and changes in articular cartilage.[5] The causes of such age-related

joint disorders are considered to be due to several factors that are responsible for KOA i.e. it can be due to genetics, or joint injuries.[6] Participating in Games, and obesity may lead young adults to the development of OA. Previously reported patients with knee injuries due to some trauma were having risk of KOA.[6]

Reducing the stress and load placed upon knee joints may lead to a reduction in the worsening of the condition and a decrease in pain and disability.[7] Despite the above-mentioned factors, other three factors i.e. kneeling, squatting, and prolonged bending knees sitting were considered to be one of the main primary risk factors for knee joint disorder.[8] Frequently too much squatting exercise or position with bent knees predisposes people to develop KOA. A study conducted showed that 68% of women and 40% of men aged 25 years reported squatting greater than an hour per day at risk of developing KOA. Prolonged squatting and sitting were the main risk factors that are associated with reduced joint space between the tibia and femoral bone leading to KOA among the elderly.[9] Another main risk factor is obesity alone or in patients having some other types of metabolic syndromes increases the risk of symptomatic KOA but has less effect on the progression of knee OA.[10] Along with obesity, another risk factor such as Maniscal surgery can increase the chances of having KOA by 2.6 times 11. Those Patients who have undergone reconstructive surgeries and partial meniscectomy are significantly more prone to develop KOA of radiographic features than those having normal menisci with no surgeries.[11]

Regarding clinical features and diagnosis morning stiffness <30 min, persistent knee pain, and loss of function are the three main symptoms that are considered as main features for the non-radiological diagnosis of KOA given by the European Alliance of Associations for Rheumatology(EULAR). [12] The early most common symptom of KOA is pain which can lead to chronic disability and may be attributed to KOA. Pain can be mild, moderate, or severe. Pain, in KOA is increased by activity and subsides by rest. In the presence of the above-mentioned six signs and symptoms, the chances of having symptomatic KOA increase to 99%.[13]

KOA in most cases can be diagnosed based on physical examination and clinical findings, however, in some cases, Radiological findings for identification of joint damages such as degeneration or trauma are very much necessary for both extent of joint involvement and diagnostic confirmation. Conventional plain X-ray is the most common imaging procedure to be requested to demonstrate the pain related to structural deformation related to KOA. In contrast to conventional X-rays, Magnetic resonance a new technology can visualize and differentiate the different structures within the knee joint. MRI is used to examine knee joint structures and find their relation with associated symptoms. [14] Further to imaging modalities X-rays are used to visualize bones only while MRI can differentiate between different structures such as cartilage, bone, soft tissue, tendons, and ligaments.[15] Much research had been conducted on KOA worldwide, but limited data was available in Pakistan, while no such research had been conducted in Hayatabad Peshawar before this one.

## Methodology

This was a descriptive cross-sectional conducted from October 2020 to April 2021 in Hayatabad Peshawar, Pakistan. The data collection tool for the study was a Self-reported questionnaire that focused on the diagnosis of Knee Osteoarthritis and Associated Risk factors. Inclusion criteria were people over the age of 40, male and female, residents of Hayatabad. Whereas, all those individuals suffering from trauma, poliomyelitis, rheumatoid arthritis, malignancy, and knee surgeries were excluded from the study. This research study sample size was calculated through the Open-Epi calculator. The Confidence interval and margin of error were kept at 95% and 5% respectively. Moreover, the expected prevalence proportion was kept at 50% (p=0.50). After keeping the non-response rate at 6% sample size was calculated to 409 participants. In addition, the overall sample was selected from one community only. Moreover, a simple convenience sampling technique was used during the collection of data. The participants who fulfilled the requirement of the selection were included in the current research study. Additionally, a self-structured questionnaire was used during the collection of primary data. The research questionnaire contained only closed-ended questions. The questionnaire consisted of two parts. The first part inquired about the demographic data, and the second part consisted of twenty questions about physical activities, accidents, stiffness, knee in upstairs and downstairs knee joint injury or trauma, and morning stiffness.[15] The questionnaire was validated by various authors of other studies and reliability was done through the Alpha Cronbach test. The questionnaire was distributed among the targeted populations to identify the prevalence and related risk factors of Knee Osteoarthritis (KOA) in residents of Hayatabad Peshawar and find a correlation to different aspects e.g., SEX, BMI, AGE, etc. The data of this research study was analyzed through SPSS version 28. Frequencies and percentages were calculated for categorical variables through SPSS. Similarly, standard deviation and mean were calculated for continuous variables during research data analysis. Moreover, the proposal was presented initially and permitted by the graduate committee Ref No. KMU/IPMR/S13/20 of the

Institute of Physical Medicine and Rehabilitation KMU Peshawar. In addition, after the approval of the graduate committee, the proposal was presented to the institutional research board of Khyber Medical University Peshawar, Pakistan and they granted us the Ethical approval (with ref no. KMU/IPMR/S13/20) for data collection. Similarly, before filling the questionnaire written consent was taken from every respondent. The questionnaire was explained to every respondent before data collection in the local language. Moreover, for ensuring confidentiality data collection was arranged in a separate room. All the respondents were that data information would never be shared with anyone however with the research supervisor. The data providers were strongly guaranteed that data would be published in a research journal for clinical dedications.

## Results

The total number of participants in the current study was 409, among which 245(59.9%) were male and 164(40.1%) were female. The mean age of the participants in the current study was 65.12±5.69 years while the mean BMI of the participants was 30.82±6.42. The number of female participants having OA was 92(56.1%) while 75 (30.6%) male participants had OA as shown. Among the total participants' the prevalence of OA was found to be 167 (40.83%) while the remaining 245 (59.9%) participants had no OA in Table I.

**Table I: Demographic data.**

| | Variable | Frequency (%) |
|---|---|---|
| **Gender** | Male | 245(59.9%) |
| | Female | 164(40.1%) |
| **Male** | Positive | 75 (30.6%) |
| | Negative | 170 (69.4%) |
| **Female** | Positive | 92(56.1%) |
| | Negative | 72(63.9) |
| | Positive | 167 (40.83%) |
| | Negative | 245 (59.9%) |

*Note: "Positive" indicates the presence of KOA in the mentioned number of participants whereas, "Negative" indicates the absence of KOA*

By applying the Pearson correlation, it was found that BMI in the current study was statistically not significant whereas, osteoarthritis is highly correlated with Age indicating that if age increases, the chances of OA will also increase as shown in Table II

**Table II: Shows the Correlation of Knee OA with age and BMI.**

| Variable | Knee Osteoarthritis | |
|---|---|---|
| | r-Value | p-Value (Shapiro Wilk test) |
| Age | 0.360 | 0.001 |
| BMI | 0.14 | 0.771 |

*Note: The Pearson correlation measures the strength of the linear relationship between two variables. In this case, the p-value was determined using this statistical test.*

Risk factors associated with KOA show that one of the major factors that played a major role in leading to KOA was found to be physical inactivity and obesity as shown in Table III.

**Table III: Shows the Frequency and Relationship of Risk Factors with OA Using Descriptive Statistics**

| | Variable | Frequency (%) |
|---|---|---|
| Risk Factors | Inactivity | 92 % |
| | Accident | 27% |
| | Steroid Use | 48% |

## Discussion

Knee Osteoarthritis is one of the most common musculoskeletal disorders. It is more prevalent in females, especially in obese and those aged more than 40. There is limited literature available about the prevalence of KOA in Hayatabad Peshawar residents.

The results show that 40.83% of Hayatabad residents have KOA. The findings of our study show a higher prevalence of KOA in female participants than male participants. The finding of our study is comparable to the cross-sectional study conducted in Framingham which shows a high prevalence in 44.2% of women and 37.7% of men.[16] The prevalence of KOA is also higher in females in other studies in comparison to our study. A study conducted in the United States shows a higher prevalence of KOA in females at 62% than in males at 45 %.[17] As compared to our study which also shows high prevalence in females. There is a significant relationship between KOA with age, gender, and BMI. Age is one of the factors that lead to Osteoarthritis. Analysis of our study shows that those who are age above 40 suffer more than those who are below 40. In comparison to our study, a study conducted regarding aging related to OA shows that the geriatric population shows a higher prevalence than the younger ones. [18]

Regarding risk factors, our study shows that age obesity, and inactivity are one of the greatest threats to developing KOA. In comparison, other studies conducted show that the risk of developing Osteoarthritis was 2.6 times greater than those who have normal BMI. In comparison to our study, our study shows a higher risk related to developing KOA by those who were more obese are whose BMI was above 30 + Also in overweight people the risk of developing KOA was higher than those who have normal BMI.[19]

Regarding inactivity in our study, those who were inactive and had only work-related activities suffered more than those who exercised daily. Inactivity is also related to the development of obesity especially in females(20). In comparison to our study inactivity-related study shows that KOA was more prevalent in those who do extensive exercises, especially squatting and kneeling. A study conducted in Europe shows the risk of

osteoarthritis increased twofold with increasing levels of participation in sporting or recreational activities before the age of 50 years and fourfold for those women who have high levels of occupational physical loads.[21] This study doesn't support our study, our study is totally against this, in our study those who were actively suffered less than those who were inactive, in correspondence to this our people were active in mild to moderate fashion activities such as jogging or walking while in comparison to the mentioned study the people studied were engaged in severe type of exercise or repetitive activities of load-bearing joints specifically hip and knee.[22] Regarding other risk factors such as hereditary, infection, and medications such as steroid use were found less in Hayatabad residents in comparison to other studies being conducted, Limited data is available regarding steroid use and its relation to KOA.

Only the residents of Hayatabad were included in our studies, therefore our study population was not representative of the overall population of patients with osteoarthritis in Peshawar. The diagnosis of KOA was based on already existing criteria and it was not backed by radiographic images.

This study concluded that the prevalence of knee osteoarthritis in the general population of Hayatabad was 40.83%. Furthermore, females were more prone to KOA than male communities, and also it shows that an increase in BMI or other factors that lead to obesity such as inactivity increases the chances of KOA. Here are some potential implications of this study for physical therapy, and prevention, Obesity, injuries, and occupational variables are all modifiable risk factors for knee osteoarthritis, according to a current study. These details can be used by physical therapists to create preventative plans that specifically address these risk factors. For instance, they may instruct people on how to control their weight, choose the right exercise routines, and use ergonomics at work to lower the chance of getting knee osteoarthritis.

## Conclusion

Knee osteoarthritis is a common musculoskeletal problem in Hayatabad, Peshawar Pakistan among adults aged 40 and above. The prevalence of KOA in this area increases with non-modifiable risk factors of age and other modifiable factors such as weight, physical activity, and steroid use. Our findings suggest that KOA is prevalent in this region and future studies should address the impact of various interventions in KOA patients.

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