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Sample survey on the prevalence of osteoarthritis

Ankieta dotycząca częstości występowania choroby zwyrodnieniowej stawów

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Abstract

Background. Osteoarthritis is the most common cause of disability, and its prevalence continues to increase as the population ages. The prevalence rises not only with age but also due to sedentary lifestyles and a lack of awareness about the importance of exercise. Determining region-specific prevalence will provide valuable information for recommending targeted interventions to treat and prevent complications of knee osteoarthritis. Objective. The primary aim of this study is to determine the prevalence of osteoarthritis in Porur and the surrounding areas of Chennai. Methods. Following ethical committee approval, a survey was conducted from August 25, 2023, to May 27, 2024. A simple random sample was drawn from patients visiting ACS Medical College and Hospital in Velappanchavadi and Mahalakshmi Multispeciality Hospital in Chennai. The survey was conducted using a questionnaire given to the patients and subjects at these hospitals. Results. Descriptive statistics show that the prevalence of osteoarthritis spans an age range of 30 to 76 years, with a mean age of 50.63 years and a standard deviation of 7.754. Conclusion. Based on the statistics, it is concluded that osteoarthritis can begin as early as 30 years of age and occur up to 76 years. Females are more likely to develop osteoarthritis. Awareness or diagnosis of osteoarthritis was found in only 68.7% of patients. Despite a lack of awareness about osteoarthritis, 100% of patients reported using home treatments and oral medications.

Key words

prevalence, osteoarthritis, disability, knee joint, sample survey

Streszczenie

Tło. Osteoartroza jest najczęstszą przyczyną niepełnosprawności, a jej rozpowszechnienie stale rośnie wraz ze starzeniem się populacji. Częstość występowania wzrasta nie tylko z wiekiem, ale również z powodu siedzącego trybu życia i braku świadomości na temat znaczenia ćwiczeń. Określenie rozpowszechnienia specyficznego dla regionu dostarczy cennych informacji umożliwiających rekomendację ukierunkowanych interwencji w celu leczenia i zapobiegania komplikacjom związanym z osteoartrozą kolan. Cel. Głównym celem badania jest określenie rozpowszechnienia osteoartrozy w Porur i okolicznych obszarach Chennai. Metody. Po uzyskaniu zgody komisji etycznej przeprowadzono badanie od 25 sierpnia 2023 do 27 maja 2024. Prostą losową próbę pobrano z pacjentów odwiedzających ACS Medical College and Hospital w Velappanchavadi oraz Mahalakshmi Multispeciality Hospital w Chennai. Badanie przeprowadzono za pomocą ankiety udostępnionej pacjentom i badanym w tych szpitalach. Wyniki. Statystyki opisowe pokazują, że rozpowszechnienie osteoartrozy obejmuje zakres wiekowy od 30 do 76 lat, ze średnią wiekiem 50,63 roku i odchyleniem standardowym 7,754. Wnioski. Na podstawie statystyk można stwierdzić, że osteoartroza może zacząć się już w wieku 30 lat i występować aż do 76 lat. Kobiety są bardziej narażone na rozwój osteoartrozy. Świadomość lub diagnoza osteoartrozy została stwierdzona tylko u 68,7% pacjentów. Pomimo braku świadomości na temat osteoartrozy, 100% pacjentów zgłosiło stosowanie domowych środków leczniczych i leków doustnych.

Słowa kluczowe

rozpowszechnienie, osteoartroza, niepełnosprawność, staw kolanowy, ankieta

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Introduction

Knee osteoarthritis (OA) is a prevalent degenerative joint disease characterized by the breakdown of cartilage, leading to pain, stiffness, and functional impairment [2]. As one of the leading causes of disability worldwide, understanding the factors that contribute to its onset and progression is crucial for developing effective prevention and treatment strategies.

The objective of this study is to investigate the prevalence of knee osteoarthritis among diverse populations and to identify modifiable and non-modifiable risk factors contributing to its development. By employing a comprehensive cross-sectional survey method, this research aims to provide valuable insights into the demographic characteristics and lifestyle factors that influence knee OA.

This study is significant for informing public health initiatives and clinical practices. By elucidating the prevalence and risk factors associated with knee OA, the findings will help healthcare providers and policymakers implement targeted interventions to improve patient outcomes and reduce the overall burden of this chronic condition. Ultimately, this research seeks to contribute to a broader understanding of knee OA and to promote better joint health in the aging population.

Osteoarthritis is a common degenerative condition that is a primary cause of disability in older adults and contributes to falls and injuries. Many studies have examined the prevalence and factors contributing to its increasing incidence. Osteoarthritis is considered the most common cause of pain and disability among adults in the Western world. In the US, it is the second leading cause of work disability in men over 50 years of age [3]. Various studies indicate a high incidence of knee OA among individuals with higher BMI (33%) and those using Western-style toilets (42.1%), reflecting challenges in using traditional Indian toilets. (42.1%), reflecting the difficulty in using Indian toilets. It is also common among people with sedentary lifestyles (82.9%) and in females. Numerous interventions have been made to treat and prevent complications of knee osteoarthritis, even though its prevalence continues to rise each year. Epidemiological studies allow for tailored treatment regimens, enhancing the prevention and management of osteoarthritis [4].

The prevalence of knee osteoarthritis varies not only by country, ethnicity, and race but also from region to region within the same country, state, or district. Understanding these variations helps identify the underlying causes of the disease and the importance of specific treatment regimens [5]. Many surveys on knee OA prevalence have been conducted in Asia, highlighting the need for targeted treatment approaches. However, these surveys have been limited to countries such as Burma, Malaysia, China, Japan and Bangladesh and have not focused on regional variations [6]. Additionally, some of these surveys have primarily focused on hip osteoarthritis, limiting knee-specific insights.

This prevalence study aimed to gather information on sex-specific prevalence, awareness, knee surgery history, diagnosis, recent falls, use of assistive devices, and knee buckling.

Materials and methods

The study was approved by the Institutional Ethical Committee of Dr. MGR Educational and Research Institute. It was a cross-sectional study conducted from March 25, 2021, to April 27, 2021, at ACS Medical College and Hospital, and Mahalakshmi Multispecialty Hospital, Chennai. Those who met the inclusion criteria and were willing to participate were included in the study.

Sampling Method

The study employed a cross-sectional survey to assess the prevalence of knee osteoarthritis (OA) and related risk factors in a representative sample. This method allows examination of demographic and health-related variables at a single point, providing a snapshot of the current state of knee OA.

Sample Size

The total sample size for the study consisted of 150 participants. This sample size was determined using statistical power calculations to ensure adequate representation and to detect significant prevalence differences among demographic groups.

Survey-Process

The survey was conducted through self-reported questionnaires distributed online and in community settings to reach diverse participants. Participants were informed about the study's purpose, and written consent was obtained. The questionnaire included sections on demographics, health history, lifestyle factors, and knee OA symptoms, using established scales like the WOMAC score.

Inclusion Criteria

Participants were eligible for inclusion if they met the following criteria:

- Aged 30 to 76 years
- Resided in the designated geographic area
- Provided informed consent- Had no prior diagnosis of other significant musculoskeletal disorders that could confound the results (e.g., Rheumatoid arthritis)

Exclusion Criteria

Participants were excluded if they met the following criteria:

- Individuals under 18 years of age
- Those with a history of major joint surgery in the past year
- Individuals undergoing treatment for serious health conditions affecting mobility or joint health (e.g., recent cancer treatment)- Participants who were unable to comprehend the survey questions due to cognitive impairments

These criteria aimed to ensure that the data accurately reflected knee OA prevalence and associated risk factors, minimizing biases and confounding variables. This rigorous sampling method enhances the validity and reliability of findings, offering valuable insights into knee OA in the studied population.

Result

The analysis of the sample survey in Table 1 and Graph 1 revealed that the mean age of individuals with knee osteoarthritis was 50.63 years, significantly lower than the hypothesized mean of 55 years ($t(149) = -6.93$, $p < 0.001$). This statistically significant difference suggests that the average age of individuals with knee osteoarthritis is younger than 55 years. The 95% confidence interval for the mean age ranges from 49.38 to 51.88 years. The chi-square test for independence, as shown in Table 2 and Graph 2,

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revealed no significant difference in gender distribution among the sample (χ^2 (1) = 0.0267, p > 0.05). The 95% confidence interval for the proportion of males in the sample is between 41.4% and 57.2%. The descriptive analysis in Table 3 and Graph 3 indicated that the mean WOMAC score (72.27) is significantly higher than the hypothesized mean of 70 (t(149) = 5.34, p < 0.001). The 95% confidence interval for the mean WOMAC score ranges from 71.43 to 73.11 for raw scores and from 74.37 to 76.07 for percentage scores.
The study surveyed 150 participants to assess the prevalence of knee osteoarthritis (OA) and its associated risk factors. The mean WOMAC score was 72.27, indicating moderate symptom severity. A p-value of < 0.001 confirmed that this mean score is substantially higher than the hypothesized mean of 70. The 95% confidence interval for the mean WOMAC score ranged from 71.43 to 73.11, suggesting that the true mean symptom severity for the broader population is likely within this range. A balanced gender distribution was observed, with 49.3% male and 50.7% female participants, suggesting similar knee OA prevalence across genders.

Table: 1 Age distribution

	N	Minimum	Maximum	Range	Mean	Std. Deviation
AGE	150	30	76	46	50.63	7.754
Valid N (list wise)	150	-	-	-	-	-

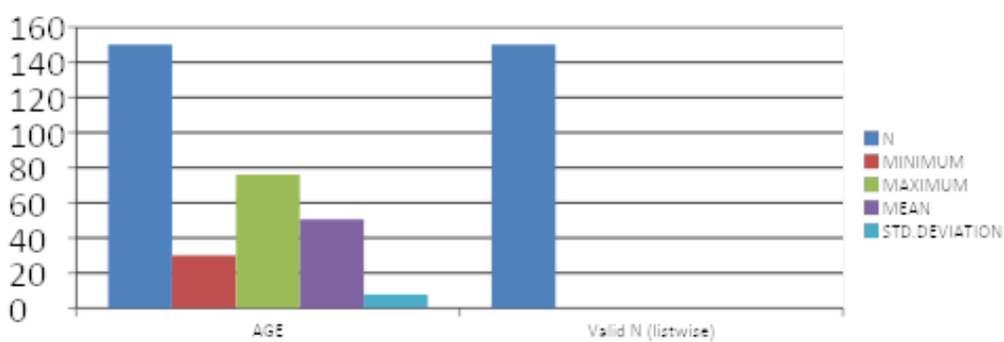


Figure 1. Graphical representation of OA – age distribution

Table 2. Sex distribution of OA Knee

	Frequency	Mean	Std. Dev.	Min	Max	Range	Percent	Valid Percent	Cumulative Percent	Test Statistic	p-value	df	Confidence interval
Valid							49.3	49.3	49.3	Chi-Square	0.027	1	95%
MALE	74						50.7	50.7	100.0				
FEMALE	76						100.0	100.0					
TOTAL	150	50.63	7.754	30	76	46				p-value	0.869		

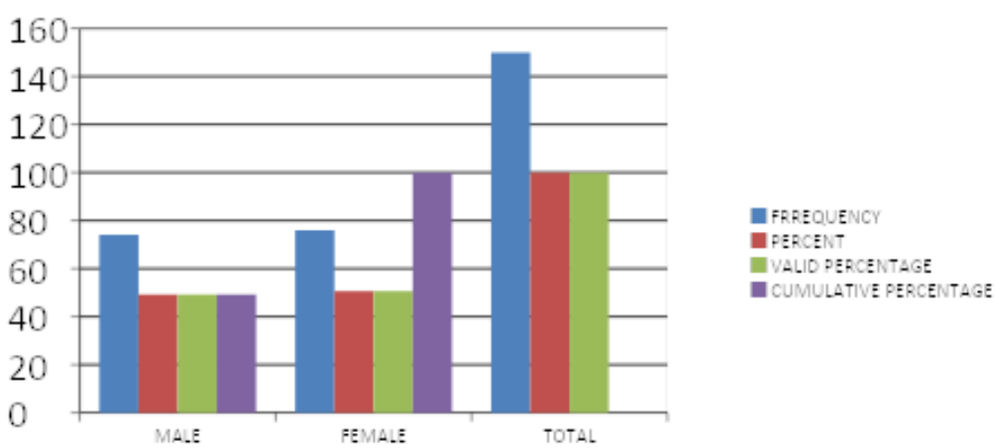


Figure 2. Graphical representation of OA – Sex distribution

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Table:3 Descriptive statistics for WOMAAC Score out of 96 and WOMAAC score in percentage

	N	Minimum	Maximum	Mean	Std.Deviation	p-value	df	Confidence interval
WOMAAC SCORE OUT OF 96	150	58	85	72.27	5.203	0.0003	1	95%
WOMAAC SCORE (%)	150	61	89	75.22	5.263			
Valid N (listwise)	150							

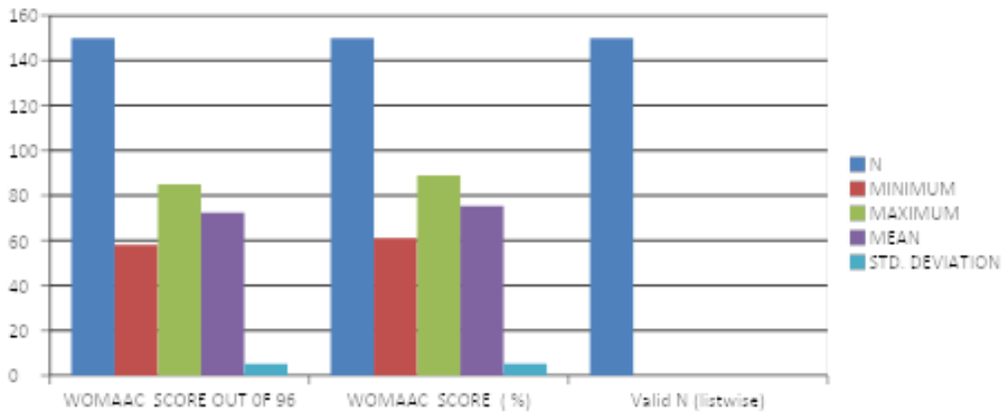


Figure 3. Graphical representation of OA- WOMAAC QUESTIONNAIRE.

Discussion

Findings from surveys and studies on knee osteoarthritis (OA) indicate an urgent need to address this widespread public health concern. The balanced gender distribution suggests that males and females are equally affected by knee OA, challenging the notion that it predominantly affects women. The mean WOMAC score of 72.27 indicates considerable symptom severity, exceeding the hypothesized mean of 70. This result aligns with other studies that have explored the prevalence and severity of knee OA symptoms. For instance, research in Saudi Arabia identified modifiable and non-modifiable risk factors contributing to symptomatic knee OA, emphasizing the need for targeted prevention strategies [7]. Additionally, findings from India reported a prevalence of knee OA risk factors among young adults, highlighting that lifestyle choices play a significant role.

The significant p-value (< 0.001) associated with the WOMAC score confirms that symptom severity is a pressing clinical concern.It underscores the necessity for healthcare practitioners to prioritize effective management strategies, such as physical therapy or lifestyle modifications, to alleviate symptoms.

The 95% confidence interval for the mean WOMAC score (71.43 to 73.11) further supports the reliability of these findings, suggesting that the true mean symptom severity in the broader population is likely within this range [8]. This confidence level provides a solid foundation for future research and study design. Studies have shown that early detection and management of knee OA can significantly alter disease progression and improve patient outcomes. The increasing prevalence of knee OA underscores the need for public health initiatives to educate individuals about risk factors like obesity and sedentary lifestyles [9].

This cross-sectional study aimed at determining the prevalence and the level of awareness about osteoarthritis knee in the general population in Chennai. Ageing, obesity, and injury to the joint structures due to repeated knee-bending activities such as squatting and kneeling are common risk factors for OA knee. Pain, joint stiffness, and other OA symptoms not only limit physical function but also impact mental health, reducing quality of life [10].

Various studies in the past have reported the occurrence of osteoarthritis knee in the elderly population; only a few population-based studies have recorded the frequency and the characteristics of osteoarthritis knee in people under the age of 40. [11] This study's data show that knee osteoarthritis symptoms increase with age, ranging from 30 to 76 years in Chennai, with a pain prevalence of about 68.7%. It is important to prevent and give early treatment of knee osteoarthritis to improve the quality of life of individuals.

Early prevention of OA is possible only with increased awareness. A study by Mohammed S. Mukharrib et al. stated that approximately 89.0% of the subjects were aware of the preventive measures for knee OA. 84.1% of the subjects were aware of the relieving measures of knee OA. And totally 82.6% of the subject had good awareness about osteoarthritis knee [12]. In this study, 68.7% of patients were aware of knee OA, while 31.3% were unaware.

Subjects with knee pain were involved in the study, and their musculoskeletal condition was assessed with the WOMAC Questionnaire. WOMAC was used to assess the health status and quality of life of the people in terms of knee osteoarthritis. The questionnaire contains the following 17 questions regarding functional activities, 5 questions regarding painful activities, and 2 questions regarding joint stiffness. [13]

The WOMAC Questionnaire provides a score out of 96, with pain accounting for up to 75% of the score. Where the knee pain is more prevalent in females than the males, of course, it is notable that the women participated more in the study than men, due to the lack of awareness of knee pain (OA) in females [14]. The risk of falling (89.23%) and stumbling (41.54%) is higher in patients with severe osteoarthritis compared to healthy older adults. Knee pain, joint stiffness, physical activity limitation, muscle weakness—all these increased the fall risk. This study agrees that the risk of fall

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is greater in osteoarthritis knees, with the cumulative percentage for recent falls being 7% and knee buckling being 96.7%.

Researchers may find this study useful for understanding public awareness and age-related causes of knee osteoarthritis, potentially guiding strategies to delay degeneration [15], so that the prevalence of osteoarthritis at an early age can be reduced. A limitation of this survey is that it did not consider factors like physical activity level that contribute to OA. Future studies should use a larger sample size and a broader participant range to improve understanding of OA prevalence.

The results of this study highlight the considerable prevalence and severity of knee osteoarthritis, emphasizing its impact on individuals' quality of life. The mean WOMAC score underscores the need for effective management strategies, as the symptom severity reflects substantial discomfort and functional limitations. The absence of a significant gender difference in prevalence challenges existing assumptions and suggests that interventions should be inclusive of all demographics. The findings align with prior research showing that modifiable and non-modifiable risk factors contribute to knee OA development. For example, studies conducted in Saudi Arabia and India have identified similar risk factors, reinforcing the need for targeted prevention strategies.

These results emphasize the importance of early detection and intervention in managing knee OA. Identifying demographic and lifestyle factors allows healthcare providers to develop tailored strategies to mitigate OA's impact. As knee osteoarthritis continues to be a growing concern, further research is essential to explore effective treatment options and enhance patient care.

In conclusion, this study provides valuable insights into knee osteoarthritis prevalence and risk factors, supporting future research and interventions to improve patient outcomes.

In summary, the results obtained from these studies underscore the urgent need for comprehensive strategies to manage knee OA effectively. They highlight the importance of understanding the demographic and lifestyle factors influencing the disease's prevalence and severity. Future research should continue to explore these dimensions and evaluate the effectiveness of targeted interventions to mitigate the impact of knee OA on affected populations. Knee osteoarthritis affects public health by causing chronic pain, joint movement limitations, and functional impairment, thereby reducing quality of life [15].

Conclusion

This study underscores the significant prevalence of knee osteoarthritis (OA) across diverse populations, revealing critical risk factors that contribute to its development. The findings from studies in India highlight the complexity of knee OA, showcasing both modifiable and non-modifiable factors that affect symptom severity and overall disease burden. The data emphasize the importance of implementing targeted prevention and intervention strategies tailored to specific demographic and lifestyle factors. As knee OA continues to pose a substantial health challenge, further research is essential to develop effective management approaches and improve patient outcomes. Addressing this concern will require collaboration among healthcare providers, researchers, and policymakers to enhance awareness and promote effective treatments for knee OA.

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