

A Study to Assess the Association Between Knee Osteoarthritis and Selected Demographic Variables Among Adults Residing in Rural Area Karad Taluka

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ABSTRACT

Abstract

Introduction: Knee osteoarthritis is a prevalent degenerative joint disorder characterized by pain, stiffness, reduced mobility, and functional impairment. It is a major cause of disability among adults, especially in rural populations where access to healthcare and preventive services is limited. Demographic and lifestyle factors play an important role in influencing the prevalence and severity of knee osteoarthritis.

Objective: To assess the association between knee osteoarthritis and selected demographic variables among adults residing in rural Western Maharashtra.

Materials and Methods: A quantitative, descriptive cross-sectional research design was used for the study, which was conducted in selected rural areas of Western Maharashtra. A total of 100 adults diagnosed with knee osteoarthritis were selected through purposive sampling. Data were collected using a structured demographic questionnaire and the Knee Injury and Osteoarthritis Outcome Score (KOOS) scale. Descriptive statistics summarized demographic characteristics and osteoarthritis severity, while the Chi-square test of independence was used to assess the association between knee osteoarthritis and selected demographic variables.

Results: The study findings demonstrated a statistically significant association between age group and the level of knee osteoarthritis as measured by pre-test KOOS scores ($p < 0.05$), indicating that the severity of osteoarthritis increased with advancing age. No statistically significant association was observed between knee osteoarthritis

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severity and other demographic variables such as gender, educational status, occupation, body mass index, or marital status ($p > 0.05$).

Conclusion: The study concluded that age is a significant demographic factor influencing the severity of knee osteoarthritis among adults in rural Western Maharashtra. Early screening, awareness programs, and targeted preventive and rehabilitative interventions for high-risk populations may help reduce disease burden and improve functional ability and quality of life.

Keywords: Knee, osteoarthritis, Knee osteoarthritis, demographic variables, adults, rural population.

How to cite this article: Bhosale SA, Katti AV, Phuke M, Mane UR, Pawar PA, Desai MM. A study to assess the association between knee osteoarthritis and selected demographic variables among adults residing in rural area Karad Taluka. *Int J Drug Deliv Technol.* 2026;16(7s): 183-189; DOI: 10.25258/ijddt.16.7s.21

INTRODUCTION

Osteoarthritis (OA) knee is a degenerative disease of the joints caused by long-term, irreversible destruction to the articular cartilage. The articular cartilage gradually and steadily deteriorates. The cartilage may rub against one another when a person has an injury in their knee joint or is in an improper position. The knee joint becomes deformed as a result of the friction, which also causes discomfort, oedema, stiffness, inflammation, and reduced mobility.⁽¹⁾

An inflammation of a joint that causes pain, swelling, and restricted joint movement is called arthritis. The most prevalent kind of arthritis, osteoarthritis (OA), is a joint failure in which all joint tissues experience pathologic alterations, frequently simultaneously.⁽²⁾

Although OA affects nearly every joint, the knee and hip joints are most frequently impacted.

OA is thought to affect 10% to 15% of persons over 60 worldwide, with a higher frequency in women than in males.⁽³⁾ According to community survey statistics, the prevalence of OA in India's rural and urban areas ranges from 17% to 60.6%.⁽⁴⁾ Because it quantifies the social and personal context of patients' lives and forecasts mortality and the use of medical resources, quality of life (QoL) is a valuable and popular indicator of health status.⁽⁵⁾ The degenerative joint condition known as osteoarthritis (OA) primarily affects the articular cartilage. According to estimates, 18.0% of women and 9.6% of men over 60 have symptomatic osteoarthritis. It has an impact on regular physical activity like squatting and climbing stairs. The primary symptom is pain. In light of this, the study's goals were to determine the prevalence of knee OA in adults over 40 living in rural areas and to investigate the relationship between risk variables and knee OA.⁽⁶⁾ Common clinical signs include knee stiffness, progressive knee discomfort that gets worse with activity, and swelling, pain that gets worse over time, and soreness fo

llowing extended sitting or relaxing.

When conservative treatment for knee osteoarthritis doesn't work, surgical treatments are considered.⁽⁷⁾ OA is more frequent in women, and its prevalence rises with age. OA has a substantial impact on mobility, especially in women, and after the age of 45, the condition is more common in women.⁽⁸⁾ Sixty-three (42%) of the 150 older individuals who were interviewed had OA knees.

Knee OA was found to be substantially correlated with female gender, history of knee injuries, family history of knee pain, other chronic illness, current physical activity, BMI, and smoking status ($p < 0.05$).⁽⁹⁾

One long-term degenerative joint condition is osteoarthritis (OA). According to reports, the prevalence of knee osteoarthritis rises in premenopausal women and stays high during menopause.

With a life expectancy of 68.2 years, the proportion of senior Indians in the 2011 census rose to .6%. Because of this, Indian women have had osteoarthritis for a longer period of time than women in other nations. Reduced physical activity is also linked to osteoarthritis, which has an impact on health-related quality of life.⁽¹⁰⁾

Aim

To determine the Association Between Knee Osteoarthritis and Selected Demographic Variables Among Adults Residing in Rural Karad Taluka.

Objectives:

To assess the association between knee osteoarthritis and selected demographic variables among adults residing in rural area karad taluka.

MATERIALS AND METHODS

Setting :-

The study was conducted in selected villages of Karad Taluka for sample recruitment and intervention. Follow-up was carried out at the participants' residences.

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Sample and Sample Size:-

The study included 100 adults diagnosed with knee osteoarthritis, with 50 participants each in the control and experimental groups. Group allocation was done using the lottery method.

- A Study Conducted By Walaa Hassan Abd Alfatah In 2016 Sample Size For My Study Is – ⁽¹¹⁾

$$n = \frac{(Z_a + Z_B)^2 \times (S_1^2 + S_2^2)}{(M_2 - M_1)^2}$$

$$n = \frac{(1.96 + 1.64)^2 \times 2.17^2 + 4.11^2}{(5.49 - 7.31)^2}$$

$$n = 84.53$$

$$n = 85$$

Total sample Size- – 100 for my study

Sampling Technique:-

Purposive sampling technique was used to select the participants.

Variables under Study

Independent Variable;- Demonstration of quadriceps strengthening exercises.

Dependent Variable:- Knee osteoarthritis among adults.

Tools for Data Collection:-

A structured interview schedule and rating questionnaire were used. Quadriceps strengthening exercises were demonstrated as the intervention.

Data Analysis

Data were analyzed using frequency, percentage, mean, and standard deviation. The chi-square test was applied to assess associations.

Inclusion Criteria

The study included adults diagnosed with knee osteoarthritis by a physician in clinical settings who were not receiving any treatment for osteoarthritis.

Exclusion Criteria

Adults who had undergone knee surgery or had

associated medical conditions such as cancer, fractures, or a history of spinal surgery were excluded from the study.

Limitations

This study was confined to two selected villages of Karad Taluka, which may limit the generalizability of the findings to other populations and settings.

Conclusion

The findings of the study indicate that quadriceps strengthening exercises are effective in reducing pain and improving the quality of life among adults. Therapeutic exercise plays a significant role in relieving pain and stiffness, enhancing physical activity, and promoting a healthy lifestyle, thereby contributing to improved overall quality of life.

Acknowledgement:

The authors would like to express their sincere gratitude to the authorities of Karad, Krishna Vishwa Vidyapeeth (Deemed to be University), and the Krishna Institute of Nursing Sciences, Karad, for their support and cooperation. We also extend our heartfelt thanks to all the study participants for their valuable time, willingness, and cooperation throughout the study.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee. Written informed consent was secured from all participants, and confidentiality was maintained.

Financial support and sponsorship -Nil.

Conflicts of interest-NIL

Statistical Analysis

Chi square test of independence was done to find association between demographic variables and level of pre-test KOOS score of adults from control group. It was found that, there was significant association between age groups and level of pre-test KOOS score ($p < 0.05$). No association could be found with any other demographic variable with level of pre-test KOOS score $p > 0.05$.

Table-1: Association between demographic variables and level of Pre-test KOOS score of adults with osteoarthritis from control group

n = 100

Sr. No.	Control group	Level of KOOS scale score before intervention						Chi square statistic	p value
		Mild		Moderate		Total			
		F	%	F	%	F	%		

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1	Age groups									
	40-45 years	8	44.44	10	55.56	18	36	23.21	<0.001	
	46-50 years	5	83.33	1	16.67	6	12			
	51-55 years	10	90.91	1	9.09	11	22			
	56-60 years	1	50.00	1	50.00	2	4			
	61 and above	0	0.00	13	100.00	13	26			
2	Sex									
	Males	5	71.43	2	28.57	7	14	1.79	0.18	
	Females	19	44.19	24	55.81	43	86			
3	Religion									
	Hindu	23	48.94	24	51.06	47	94	0.28	0.6	
	Christian	1	33.33	2	66.67	3	6			
4	Educational status									
	Illiterate	6	50.00	6	50.00	12	24	0.5	0.92	
	Primary	7	41.18	10	58.82	17	34			
	Secondary	10	52.63	9	47.37	19	38			
	Graduate and above	1	50.00	1	50.00	2	4			
5	Occupation									
	Housewife	19	48.72	20	51.28	39	78	5.09	0.17	
	Farmer	1	33.33	2	66.67	3	6			
	Own business	3	100.00	0	0.00	3	6			
	Job	1	20.00	4	80.00	5	10			
6	Type of family									
	Joint family	21	50.00	21	50.00	42	84	0.42	0.52	
	Nuclear family	3	37.50	5	62.50	8	16			
7	Income									
	Less than Rs.2,000	6	60.00	4	40.00	10	20	1.67	0.64	

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	Rs. 2000- Rs. 4000	3	33.33	6	66.67	9	18		
	Rs. 4001- Rs. 6000	6	42.86	8	57.14	14	28		
	Rs. 6001 and above	9	52.94	8	47.06	17	34		
	Place of living								
8	Rural	23	46.94	26	53.06	49	98	1.11	0.29
	Urban	1	100.00	0	0.00	1	2		
	Type of diet								
9	Veg	3	100.00	0	0.00	3	6	3.46	0.06
	Non veg	21	44.68	26	55.32	47	94		
	Total	24	48.00	26	52.00	50	100		

Description of Table-1

To find an association between osteoarthritis among adults and socio demographic variables

A chi-square test of independence was performed to assess the relationship between demographic variables and the level of pre-test KOOS scores among adults in the control group. The results revealed the following:

- **Age Groups:** There was a significant association between age groups and the pre-test KOOS score ($p < 0.05$), indicating that different age groups within the control group had varying levels of pre-test KOOS scores.
- **Other Demographic Variables:** No significant associations were found between pre-test KOOS scores and other demographic variables such as gender, education level, or occupation ($p > 0.05$). This suggests that these factors did not have a statistically significant relationship with the pre-test KOOS scores in the control group.

In summary, the analysis showed that age groups were significantly related to the pre-test KOOS scores among adults in the control group, while other demographic variables did not show significant associations.

In the experimental group, since all participants had a moderate level of KOOS scores at the pre-test, there was no variability in pre-test scores within this group. Consequently, a chi-square test of independence could

not be conducted to explore associations between demographic variables and pre-test KOOS scores. The chi-square test requires variability in the variables being tested to determine associations. In this case, the lack of score variability means there were no differences to analyse or test for associations. As such, any attempt to analyse associations between demographic variables and pre-test KOOS scores in this context would not provide meaningful insights.

DISCUSSION

The association between demographic factors and the pre-test KOOS scores among adults in the control group was investigated using the Chi-square test of independence. Age groups and the level of pre-test KOOS scores were shown to be significantly correlated ($p < 0.05$). Other demographic factors, however, did not significantly correlate with the pre-test KOOS scores ($p > 0.05$). In a related study by **Absar Ahmed Qureshi and Shadia Hamoud Alshahrani (2021)**, the analysis showed that the study and control groups' mean ages were 53.24 ± 8.16 and 54.13 ± 8.87 , respectively, and that there was a difference between the groups' pre and post test scores for pain and functional ability. The exercise group's pain and functional ability scores improved, and the difference was statistically significant ($p < 0.001$).⁽¹²⁾

18 adults (36%) between the ages of 40 and 45, 6 adults (12%) between the ages of 46 and 50, 11 adults (22%) between the ages of 51 and 55, 2 adults (4%)

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between the ages of 56 and 60, and 13 adults (26%) above the age of 61 made up the control group. Eleven adults (22%) aged 40–45, ten adults (20%) aged 46–50, eight adults (16%) aged 51–55, five adults (10%) aged 56–60, and sixteen adults (32%) aged 61 and older made up the experimental group. Number Needed to Treat (NNT) was 3 (95% CI, 1.4, 4.8) and 4 (95% CI, 1.8, 29.4) for the exercise therapy focused on the combination of "quadriceps and hamstring" for the outcome of $\geq 30\%$ and $\geq 50\%$ improvement in VAS score, respectively, according to a similar study by **Alireza Sadeghi (MD), Mina Rostami (MD), and Zakiye Khanlari (MD) (2022)** On the other hand, NNT $\geq 30\%$ for "hamstring" strength workouts was 25, while NNT $\geq 50\%$ reduction in VAS score could not be determined. ⁽¹³⁾

Limitations:

The study was restricted to two particular communities in Karad Taluka, which would limit how broadly the results can be applied.

Conclusions

The study's conclusions show that quadriceps workouts were successful in lowering pain and enhancing people's quality of life after the exercise intervention.

Therapeutic activities are important for fostering a healthy lifestyle, increasing physical activity, and reducing pain and stiffness. Adults' functional capacity and general quality of life can be enhanced by regularly including such workouts.

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