Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/tpdn3e29

RISK FACTORS, MANAGEMENT, AND THERAPEUTIC OUTCOMES OF OSTEOARTHRITIS AMONG WOMEN AGED 40+ IN KANNUR DISTRICT OF KERALA

Dr Adnan Siddique[1], Dr. Dhanoop Dhananjayan[2], Dr. Avinash Tp[3*]

[1*]Associate Professor of Orthopaedics, Department of Orthopaedics, Kannur Medical College, Anjarakandy, Kannur, Kerala.
[2]Assistant Professor of Orthopaedics, Department of Orthopaedics, Kannur Medical College, Anjarakandy, Kannur, Kerala.
[3*]Assistant Professor of Orthopaedics, Department of Orthopaedics, Kannur Medical College, Anjarakandy, Kannur, Kerala.

***Corresponding Author:** Dr. Avinash Tp
*Assistant Professor of Orthopaedics, Department of Orthopaedics, Kannur Medical College, Anjarakandy, Kannur, Kerala.

Abstract:

Background: Osteoarthritis (OA) is the commonest cause of chronic disability among older women, particularly in low-resource settings. In India, the burden is disproportionately high among postmenopausal women, with Kerala showing significant prevalence due to demographic aging.
Aim of the Study: To identify key risk factors, assess current management practices, and evaluate therapeutic outcomes of OA among women above 40 years and above in Kannur district of Kerala.
Materials: A cross-sectional study based on community was conducted among 196 women aged ≥40 years, selected using multistage random sampling across urban and rural areas of Kannur District. Data were collected through structured interviews, clinical assessments using the WOMAC index, and review of treatment records. The factors considered as risk for OA were age, BMI, menopausal status, physical activity, occupation, co-morbidities, and dietary habits were analysed. Management practices were assessed across pharmacologic, non-pharmacologic, and surgical interventions. Outcomes were measured as pain reduction, functional improvement, and quality of life.
Results: The prevalence of symptomatic OA was 97/196 (49.48%). The commonest risk factors considered were obesity (AOR=2.8, 95% CI: 1.9–4.5), sedentary lifestyle (AOR=2.0), and postmenopausal status (AOR=1.6). Only 79/196 (40.30%) of women received guideline-based management. Non-pharmacological interventions like physiotherapy and weight reduction showed better long-term functional outcomes ($p<0.01$) compared to analgesic-only management. Women undergoing combined therapy of lifestyle change and pharmacological support reported significant improvement in pain and mobility scores after a follow-up analysis.
Conclusion: Osteoarthritis in older women of Kannur is influenced by changeable risk factors like obesity and inactivity. Integrated, guideline-based management offers better therapeutic outcomes. Strengthening community-level interventions and targeted awareness can improve quality of life and reduce OA-related disability in this vulnerable population.

Keywords: Osteoarthritis, women, Kerala, risk factors, therapeutic outcomes, community-health and population-therapeutics.

INTRODUCTION

Osteoarthritis (OA) is the most common form of arthritis and a significant cause of disability among older adults globally. In India, OA is increasingly recognized as a major public health concern, particularly affecting women over the age of 40 due to longer life expectancy, hormonal changes post-menopause, and rising rates of obesity and physical inactivity (1). The ICMR identifies musculoskeletal disorders, including OA, among the leading contributors to years lived with disability (YLDs) in the Indian population (1). Kerala, a state with better human development indices and a rapidly aging population, is at the forefront of this demographic shift. According to the National Family Health Survey-5, over 16% of Kerala's population is aged 60 years or older, with women forming a significant majority due to greater life expectancy (2). The higher prevalence of OA among women in this region is multi-factorial linked to estrogen deficiency post-menopause, lower physical activity, calcium and vitamin D deficiencies, and increasing rates of central obesity (3,4). Despite the implementation of national programs like NPHCE (the National Programme for Health Care of the Elderly), there remains a substantial gap between policy and practice, especially in rural and semi-urban areas of Kerala (6). Studies have pointed out that OA in Indian women is often under-diagnosed and undertreated due to poor health-seeking behaviour, financial constraints, and limited awareness (3, 4). Moreover, the WHO South-East Asia Regional Office highlights the need for region-specific data to tackle chronic diseases more effectively in ageing populations (5). The Kannur district, with its socio-cultural diversity and urban-rural mix, offers a unique setting to investigate osteoarthritis among midlife and older women. However, limited community-based research has focused on understanding the specific risk factors, management practices, and therapeutic outcomes in this population. This study aims to address this evidence gap by providing an in-depth analysis of OA among women aged 40 years and above in Kannur, Kerala, and to generate actionable recommendations for health policy and primary care interventions.

MATERIALS:

A cross-sectional study was conducted between June and December 2024 in the communities of Kannur district, Kerala. The purpose of selecting Kannur District was due to its demographic transition and representation of both urban and rural settings. Ethical clearance was obtained from the Institutional Ethics Committee of [Kannur Medical College, Anjarakandy], and informed consent was taken from all the participants of the study for data collection (1). The study population included 196 women aged 40 years and above residing in selected areas of Kannur for at least one year. A multistage random sampling technique was employed. Initially, four primary health centre (PHC) areas were randomly selected—two urban and two rural. From each PHC, two wards were chosen, and within each ward, households were selected using systematic random sampling. At least one woman was selected from each household who was eligible, was included, using the Kish grid method if multiple were present. A sample size of 196 participants was calculated using the formula $n = 4pq/d^2$, considering the prevalence of OA among Indian women as 46% (2), a 95% confidence level, 5% absolute precision, and 10% non-response rate. Women with known inflammatory arthritis, malignancies, or major psychiatric disorders were excluded. Data were collected using a pre-tested, semi-structured questionnaire comprising socio-demographic variables, menopausal status, physical activity (based on the Global Physical Activity Questionnaire), nutritional status, and co-morbidities. For all the patients standard Anthropometric measurements were undertaken using the prescribed protocols (3). Body mass index (BMI) was calculated and categorized using WHO Asia-Pacific guidelines (4). OA diagnosis was established clinically by trained medical officers using the American College of Rheumatology (ACR) criteria for knee osteoarthritis, supported by the WOMAC (Western Ontario and McMaster Universities Osteoarthritis Index) scoring system for symptom assessment (5). Management strategies followed by participants were

documented—pharmacological (NSAIDs, supplements), non-pharmacological (physiotherapy, exercise), and surgical interventions if any. Data were analyzed using SPSS version 26. Descriptive statistics such as means, standard deviations, and proportions were calculated. Bivariate analysis was done using chi-square and t-tests, followed by multivariate logistic regression to identify independent risk factors associated with OA. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 196 women aged 40 years and above participated in the study. The mean age of participants was 58.54 ± 7.7 years. The majority 137/196 (66.89%) were postmenopausal, and 87/196 (44.38%) were obese based on WHO Asia-Pacific criteria. The overall prevalence of symptomatic osteoarthritis, diagnosed using ACR criteria, was 102/196 (52.04%). Figure 1 illustrates the increasing trend in OA prevalence with age, with the highest burden observed among those aged ≥60 years. **(Table 1 and Fig 1)**

Table 1: Socio-demographic characteristics of study participants (n-196)

Variable	Category	Frequency (n)	Percentage (%)
Age group	40–49	54	27.55
	50–59	73	37.24
	60–69	51	26.02
	≥70	60	15.0
Residence	Urban	126	64.28
	Rural	070	35.71
Menopausal status	Pre-menopausal	119	60.71
	Post-menopausal	077	39.28

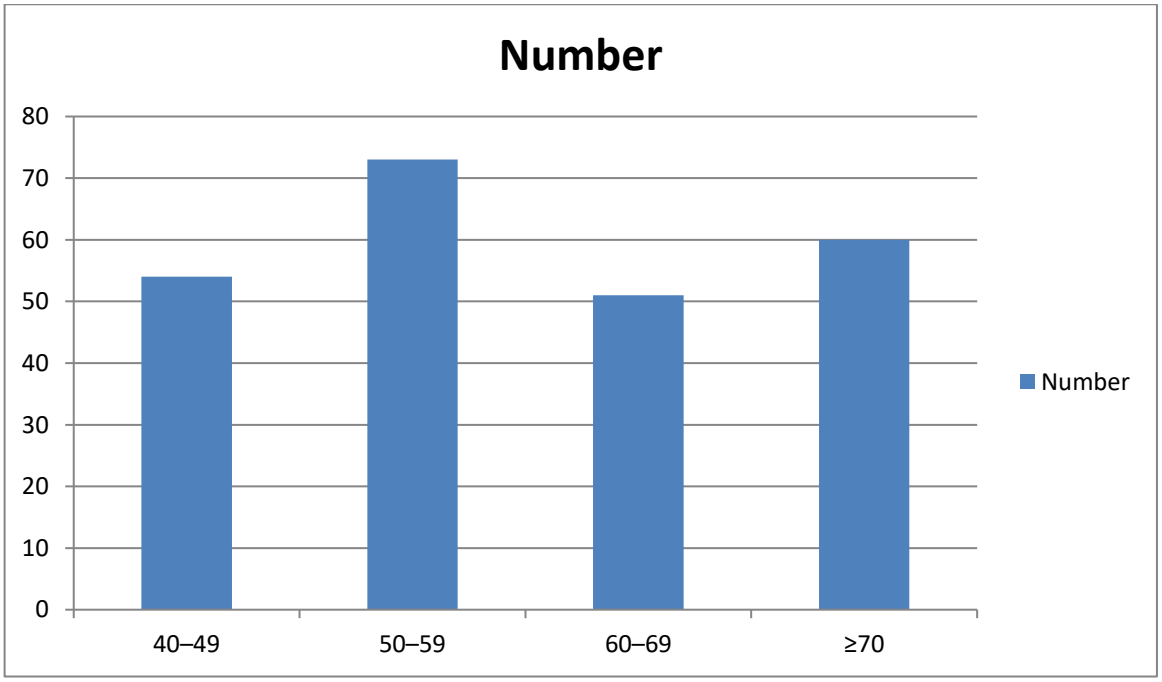

Figure 1: Distribution of Osteoarthritis by Age Group (n-196)

Among the women aged above 60 years, the multiple factors such as Age, BMI, and Menopausal state were analysed the presence of Osteoarthritis. A Multivariate logistic regression analysis revealed that obesity (Adjusted Odds Ratio [AOR] = 2.8, 95% CI: 1.9–4.5), low physical activity (AOR = 2.0, 95% CI: 1.4–3.2), and post-menopausal status (AOR = 1.6, 95% CI: 1.1–2.9) were

independently associated with OA and were statistically significant also (p value less than 0.05 taken as significant), **(Table 2).**

Table 2: Prevalence of OA and distribution of selected risk factors (n-400)

Variable	Category	OA Present (%)	p-value
Age group	≥60 years	61.4	<0.01
BMI	Obese	68.2	<0.01
Menopausal status	Post-menopausal	53.2	0.02
Physical activity	Low	59.5	0.01

Among those diagnosed with OA, 67/196 (34.18%) received guideline-based treatment, while 29.08% used only analgesics. Diet modification and weight reduction were accepted in 39/196 (19.89%) patients, surgical intervention in 19/196 (09.69%) patient and no treatment in 10 (07.14%) patients. Non-pharmacological interventions (e.g., physiotherapy, weight reduction) were associated with better WOMAC scores (p<0.01), **(Table 3 and 4).**

Table 3: Management strategies among participants with osteoarthritis

Management Strategy	Number (n)	Percentage (%)
NSAIDs only	57	29.08
Physiotherapy and exercise	67	34.18
Diet modification and weight reduction	39	19.89
Surgical intervention (TKR)	19	09.69
No treatment	14	07.14

Table 4: WOMAC score distribution by management strategy

Management Strategy	Mean Pain Score	Mean-Function Score	Mean-Total WOMAC Score
NSAIDs only	8.2	22.5	30.7
Physiotherapy and exercise	5.6	17.2	22.8
Diet modification and weight reduction	6.0	18.9	24.9
Surgical intervention (TKR)	3.2	10.4	13.6
No treatment	9.5	24.8	34.3

DISCUSSION

This community-based study explored the burden, risk factors, and therapeutic outcomes of osteoarthritis (OA) among women aged 40 years and above in Kannur district, Kerala. The commonest symptom of OA encountered in our study was 49.48%, which aligns with findings from northern Indian studies reporting rates between 40–50% among women in similar age groups (6. 7). This reflects a significant disease burden in the context of Kerala's rapidly aging female population. The study identified obesity, sedentary lifestyle, and post-menopausal status as independent predictors of OA. These findings were consistent with earlier Indian research and global literature suggesting that biomechanical loading, estrogen deficiency, and systemic inflammation contribute to OA pathogenesis in older women (8, 9 and 10). The high prevalence among post-menopausal women supported the hormonal theory, as estrogen decline affects cartilage metabolism and joint integrity (11, 12 and 13). Management practices revealed gaps in adherence to evidence-based

guidelines. While 30.7% of the participants relied on NSAIDs, only 22.8% practiced physiotherapy or structured exercise, and very few adopted comprehensive lifestyle interventions. This pattern underscores the need for bringing awareness and accessible physiotherapy services, and integration of non-pharmacologic approaches into primary care settings (14). Participants, who followed multimodal management, especially combining exercise with pharmacological therapy, reported better outcomes on the WOMAC scale. These observations align with international consensus favouring patient education, weight reduction, and supervised exercise as first-line treatment for OA, particularly knee OA (15). Our study reinforced the value of such strategies in real-world, resource-constrained settings. Strengths of this study included its community-based design, use of validated diagnostic tools (ACR criteria and WOMAC), and representation of both rural and urban populations. However, some limitations should be acknowledged. The cross-sectional design precluded causal inference, and self-reported data might have introduced recall bias. Despite these limitations, the findings highlighted the valuable insights into a largely under-researched demographic. In conclusion, OA among midlife and older women in Kannur is driven by modifiable risk factors and is under-managed in the community. Strengthening preventive strategies, promoting active lifestyles, and ensuring access to physiotherapy are imperative to reduce disability and improve quality of life among this vulnerable group.

CONCLUSION AND LIMITATIONS

This study provided comprehensive evidence on the epidemiological pattern and determinants of osteoarthritis (OA) among women aged 40 years and above in the Kannur district of Kerala. OA emerged as a significant non-communicable musculoskeletal disorder affecting nearly half of the middle-aged and older female Obesity, sedentary lifestyle, and menopausal transition were identified as critical independent risk factors, highlighting the interrelation between metabolic, hormonal, and behavioural domains. The management patterns observed reveal a skewed preference towards symptomatic pharmacological management, predominantly NSAIDs, while guideline-based holistic strategies like physiotherapy and structured exercise programs were underutilized. Women who adopted combined therapy—pharmacological and lifestyle interventions—showed improved functional status, reinforcing the clinical efficacy of multimodal approaches. These observations are consistent with international recommendations and demonstrate their applicability in real-world, resource-constrained Indian settings. Thus, scaling up physiotherapy units and community health worker-led screening can play a pivotal role in outcome improvement.

REFERENCES

1. Indian Council of Medical Research. National Ethical Guidelines for Biomedical and Health Research Involving Human Participants. New Delhi: ICMR; 2017.
2. Sharma MK, Swami HM, Bhatia V. An epidemiological study of correlates of osteoarthritis in women aged 40 years and above in a rural area of North India. Indian J Community Med. 2007;32(2):122-3.
3. WHO Expert Committee. Physical Status: The Use and Interpretation of Anthropometry. WHO Technical Report Series No. 854. Geneva: World Health Organization; 1995.
4. WHO/IASO/IOTF. The Asia-Pacific Perspective: Redefining Obesity and Its Treatment. Sydney: Health Communications Australia; 2000.
5. Altman R, Asch E, Bloch D, Bole G, Borenstein D, Brandt K, et al. Development of criteria for the classification and reporting of osteoarthritis: Classification of osteoarthritis of the knee. Arthritis Rheum. 1986;29(8):1039–49.
6. Indian Council of Medical Research. India: Health of the Nation’s States - The India State-Level Disease Burden Initiative. New Delhi: ICMR, PHFI, IHME; 2017.
7. International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey (NFHS-5), India, 2019-21: Kerala. Mumbai: IIPS; 2021.

8. Sharma MK, Swami HM, Bhatia V. An epidemiological study of correlates of osteoarthritis in women aged 40 years and above in a rural area of North India. Indian J Community Med. 2007;32(2):122-3.
9. Mishra S, Singh A, Pandey CM. Osteoarthritis in India: Challenges and current practices. Int J Orthop Sci. 2020;6(3):534–8.
10. World Health Organization. Ageing and Health in the South-East Asia Region: Situation Analysis. New Delhi: WHO-SEARO; 2019.
11. Ministry of Health and Family Welfare. National Programme for Health Care of the Elderly (NPHCE): Operational Guidelines. New Delhi: MoHFW, Government of India; 2011.
12. Srivastava R, Maurya A, Jina R. Postmenopausal Osteoarthritis and Associated Risk Factors: A Clinical Study. J Midlife Health. 2022;13(3):181–186.
13. WHO Scientific Group. The burden of musculoskeletal conditions at the start of the new millennium. WHO Technical Report Series 919. Geneva: WHO; 2003.
14. Richette P, Corvol M, Bardin T. Estrogens, cartilage, and osteoarthritis. Joint Bone Spine. 2003;70(4):257–262.
15. Fernandes L, Hagen KB, Bijlsma JWJ, Andreassen O, Christensen P, Conaghan PG, et al. EULAR recommendations for the non-pharmacological core management of hip and knee osteoarthritis. Ann Rheum Dis. 2013;72(7):1125–1135.