REVIEW ARTICLE

CONTENTS

Medication nonadherence in osteoarthritis: Review of determinants, consequences and strategies

Ariba Juayria Zubair[1], Abubakker Siddiq Mohamed Hameed[1], Sandhra Treesa Santhosh[1], Mamoun Abdulhamid Jarjouma[1], Parvathy Jyothish[1], Mateusz Kaczmarski[2], Silvija Ille[3]

[1]MEDICAL UNIVERSITY OF LUBLIN, LUBLIN, POLAND

[2]INDEPENDENT PUBLIC HEALTHCARE, GENERAL HOSPITAL IN LECZNA, LECZNA, POLAND

[3]OXFORD UNIVERSITY HOSPITAL, NHS, OXFORD, UK

ABSTRACT

Osteoarthritis (OA), particularly of the knee, represents a leading cause of chronic pain and functional limitation worldwide. Although pharmacologic therapy remains central to symptom control, real-world treatment effectiveness is frequently compromised by suboptimal medication adherence. To synthesize contemporary evidence on the determinants, clinical consequences, and targeted strategies related to medication nonadherence in osteoarthritis. A narrative review of literature published between January 2021 and February 2026 was conducted using PubMed, Scopus, and supplementary sources. Studies examining determinants of nonadherence, associated outcomes, and adherence-enhancing interventions in OA were thematically integrated. Thirty-nine studies were included. Medication nonadherence in OA is multifactorial, reflecting the interaction of patient-related, therapy-related, and healthcare system determinants. Aging, multimorbidity, cognitive vulnerability, and polypharmacy contribute to unintentional nonadherence, whereas risk perception, safety concerns, and financial barriers frequently drive intentional dose modification or discontinuation. Inconsistent medication use is associated with persistent pain, functional limitation, reduced quality of life, and increased healthcare utilization. Emerging evidence supports patient-centered education, shared decision-making, regimen simplification, pharmacist-led interventions, and digital adherence tools as promising strategies. Medication nonadherence represents a clinically consequential yet underrecognized determinant of treatment effectiveness in osteoarthritis. Addressing adherence through integrated, patient-centered, and system-level strategies is essential to optimizing symptom control, functional outcomes, and healthcare resource utilization in OA populations.

KEY WORDS: medication adherence, polypharmacy, quality of life, health care utilization, patient education

Wiad Lek. 2026;79(3):571-581. doi: 10.36740/WLek/218186 DOI

INTRODUCTION

Osteoarthritis (OA) is a chronic degenerative joint disorder characterized by active pathological processes involving an imbalance between articular tissue degradation and repair, leading to progressive structural damage and functional limitation. The condition primarily affects weight-bearing joints, particularly the knee. OA develops when joint tissues are unable to adequately repair cumulative mechanical and biological insults. Disease progression varies considerably among individuals, and common clinical manifestations include pain, stiffness, reduced range of motion, and muscle weakness [1].

Based on etiology, OA is classified into two main types: primary OA, which develops in the absence of identifiable prior trauma, and secondary OA, which arises from pre-existing joint abnormalities such as mechanical injury or systemic conditions. Established risk factors include obesity, psychological stress, advancing age, genetic predisposition, and physical inactivity [2].

The burden of OA extends beyond structural joint changes. Patients frequently experience progressive physical limitations, chronic pain, and persistent functional impairment, all of which negatively affect health-related quality of life. These consequences may lead to reduced occupational participation, decreased social and recreational engagement, and impaired sleep quality, contributing to broader psychosocial impact [3].

Current guidelines for the diagnosis and management of OA emphasize early implementation of non-pharmacological strategies, including patient education, exercise therapy, and physical therapy. Treatment goals include effective symptom control, improvement in mobility, enhancement of quality of life, reduction of disability, and avoidance of excessive dependence on medications. In early-stage disease, these foundational measures may be sufficient. However, in more advanced stages, pharmacological therapy is often required, with drug selection and administration tailored to the affected joint sites and individual patient risk factors [4].

Given the chronic and progressive nature of OA, pharmacological therapy frequently plays a central role in long-term symptom control and functional maintenance. In this context, medication adherence becomes a critical determinant of therapeutic effectiveness. Medication adherence is defined as the extent to which a patient's behavior aligns with agreed recommendations from a healthcare provider regarding the timing, dosage, and frequency of medication use. Evidence consistently demonstrates that adherence is essential for optimal management of chronic diseases and prevention of long-term complications. Poor adherence is associated with disease progression, increased morbidity, diminished quality of life, higher hospitalization rates, and mortality. Economically, medication non-adherence is estimated to cost the United States healthcare system approximately USD 100 billion annually. Accordingly, higher adherence is linked to improved clinical outcomes and reduced healthcare utilization, whereas non-adherence contributes to worse outcomes and greater overall costs [5].

Despite its recognized importance, medication adherence among patients with arthritis remains suboptimal, consistent with patterns observed across other chronic conditions. In OA, non-adherence may result from multiple factors, including forgetfulness, adverse effects, limited understanding of treatment importance, slow symptomatic improvement, and a perceived lack of therapeutic benefit [6]. Large-scale studies conducted in different countries further demonstrate persistently suboptimal adherence across chronic diseases, underscoring the need to better understand both clinical and patient-related determinants that influence adherence in order to achieve treatment goals [7].

Achieving optimal adherence depends substantially on patients' understanding of their condition, trust in the treatment plan, and ability to manage emotional and financial barriers. Increasing research attention has therefore focused on individual-level determinants, particularly health literacy, defined as the capacity to obtain, process, and understand basic health information needed to make appropriate health decisions. Low health literacy has been consistently associated with poorer adherence and adverse outcomes across chronic diseases [8].

Given the substantial clinical and societal burden of OA and the central role of pharmacotherapy in its management, a comprehensive understanding of medication adherence is essential.

AIM

This review aims to examine the barriers contributing to medication non-adherence in patients with osteoarthritis and to explore strategies to enhance adherence and improve clinical outcomes.

MATERIALS AND METHODS

REVIEW DESIGN

This review employed a narrative design to synthesize current evidence on medication nonadherence in osteoarthritis. The objective was to examine determinants of nonadherence, associated clinical and health system consequences, and potential strategies for improvement. A narrative approach was selected to allow thematic integration of findings across heterogeneous study designs, adherence definitions, pharmacological classes, and outcome measures. Given substantial variability in adherence assessment methods and reporting across studies, quantitative meta-analysis was not undertaken. Instead, a structured thematic synthesis was performed to provide clinically relevant interpretation of the literature. As a narrative review, formal risk of bias assessment tools and PRISMA reporting standards were not applied. Measures to enhance methodological transparency included multi database searching, clearly defined eligibility criteria, and structured thematic categorization. The findings are intended to provide an evidence informed synthesis of current knowledge rather than pooled quantitative effect estimates, particularly given variability in adherence definitions and limited availability of long term osteoarthritis specific longitudinal data.

LITERATURE SEARCH AND DATABASES

A literature search was conducted using PubMed as the primary database, with supplementary searches in Scopus and Google Scholar to ensure comprehensive coverage. The search focused on publications from January 2021 to February 2026. Controlled vocabulary and free text terms were combined to identify relevant studies related to osteoarthritis and medication adherence. Search terms included osteoarthritis, knee osteoarthritis, medication adherence, compliance, persistence, nonadherence, NSAIDs, analgesics, pain management, determinants, barriers, quality of life, healthcare utilization, cost, and adherence enhancing interventions such as education and digital health approaches. Boolean operators were applied to optimize search sensitivity. Reference lists of eligible articles and relevant reviews were also screened to identify additional pertinent studies. Preference was given to recent peer reviewed publications and guideline based recommendations to ensure contemporary clinical relevance.

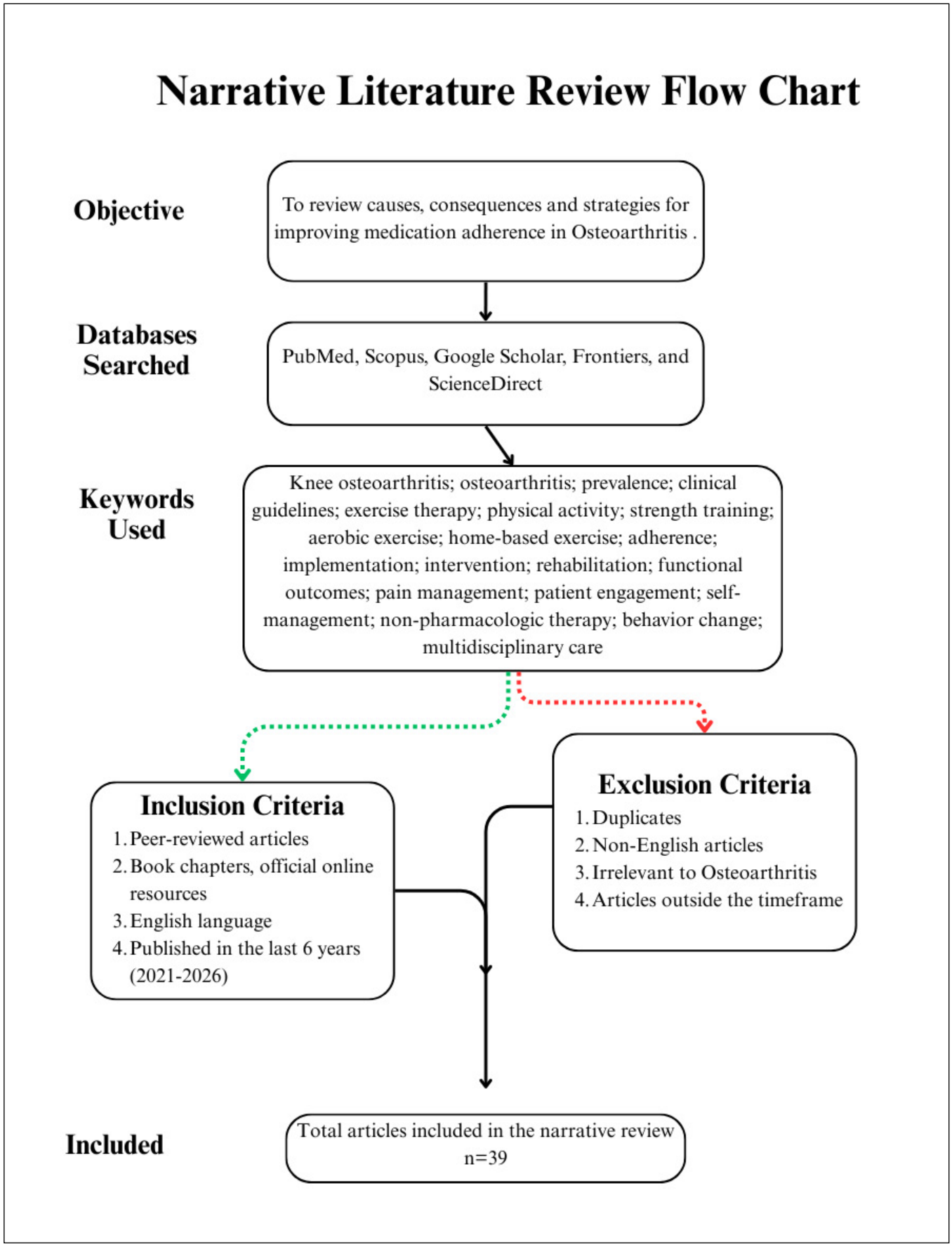

Fig. 1. Methodology flowchart summarizing literature search strategy, inclusion/exclusion criteria, and data synthesis steps used in the review
Source: Own materials

STUDY SELECTION

Given the narrative design, no formal systematic screening protocol was applied. Titles and abstracts were reviewed iteratively to assess relevance to medication adherence in osteoarthritis. Full texts were examined when eligibility was unclear or when studies aligned with the objectives of the review. Selection prioritized methodologically sound and clinically applicable studies. Preclinical research, animal studies, case reports, conference abstracts lacking sufficient methodological detail, non English publications, and studies focusing exclusively on surgical interventions without relevance to pharmacological adherence were excluded. When osteoarthritis specific evidence was limited, findings from broader chronic disease adherence literature were considered when directly applicable and clearly distinguished during synthesis. Study selection decisions were discussed collaboratively to ensure consistency in inclusion.

DATA EXTRACTION AND SYNTHESIS

From each included study, key information was extracted, including study design, population characteristics, pharmacological therapy evaluated, adherence measurement approach, identified determinants of adherence, and reported clinical or economic outcomes. Data extraction and categorization were performed collaboratively, with discussion used to resolve interpretive discrepancies. Studies were organized according to predefined conceptual domains, including patient related factors, therapy related factors, healthcare system influences, clinical consequences, and adherence improvement strategies. Findings were synthesized narratively to identify recurring patterns, areas of consistency, and gaps in the existing evidence. No statistical pooling or quantitative meta-analysis was performed.

SCOPE AND STUDY INCLUSION

A total of 39 studies were included in this review. These comprised observational studies, randomized controlled trials, systematic reviews, guideline syntheses, and interventional studies focused on adherence related outcomes. This sample was considered sufficient to provide a comprehensive and clinically meaningful synthesis of contemporary evidence on medication nonadherence in osteoarthritis. Figure 1 illustrates a flowchart outlining the process used for selecting articles included in this review.

REVIEW AND DISCUSSION

DETERMINANTS OF MEDICATION NONADHERENCE IN OSTEOARTHRITIS

Medication nonadherence in osteoarthritis reflects the interaction of patient-related, therapy-related, and healthcare system determinants. These domains are interdependent and often reinforce one another in older populations with multimorbidity.

PATIENT-RELATED DETERMINANTS

AGING, FUNCTIONAL DECLINE, AND MULTIMORBIDITY

Osteoarthritis predominantly affects older adults. In the United States, approximately 80 percent of individuals over 65 years demonstrate radiographic evidence of osteoarthritis, although only around 60 percent are symptomatic [9]. Advancing age is associated with accumulation of biological damage, declining physical and cognitive capacity, multimorbidity, and geriatric syndromes including frailty and falls, all of which may hinder consistent medication use [10].

Visual impairment, reduced manual dexterity, polypharmacy, and complex dosing regimens further complicate self-management. Evidence indicates that visually impaired older adults frequently struggle to distinguish tablets or packaging, may take incorrect doses, and often require assistance for safe medication administration [11]. These factors increase the risk of unintentional nonadherence.

COGNITIVE VULNERABILITY

Emerging research suggests that osteoarthritis is associated with increased risk of dementia and structural brain changes [12]. Cognitive decline affecting memory, executive function, and organizational skills may therefore be more prevalent in this population. Such impairment reduces capacity to maintain long-term adherence, particularly when regimens are complex or involve multiple agents.

RISK PERCEPTION, BELIEFS, AND INTENTIONAL NONADHERENCE

Intentional nonadherence is frequently driven by safety concerns. Patients with osteoarthritis often weigh potential gastrointestinal, cardiovascular, and renal risks of nonsteroidal anti-inflammatory drugs more heavily than anticipated symptom relief [13,14]. Preference studies demonstrate that avoidance of adverse effects

Table 1. Integrated framework of determinants, mechanistic pathways, clinical consequences, and targeted interventions for medication nonadherence in osteoarthritis

Domain	Determinant	Type of Nonadherence	Mechanistic Pathway	Clinical / System Consequence	Targeted Intervention Strategy
Patient-related	Advanced age, frailty	Unintentional	Reduced physical capacity and self-management ability	Missed doses, inconsistent use, symptom fluctuation	Regimen simplification, caregiver involvement
	Cognitive impairment	Unintentional	Memory and executive dysfunction impair medication organization	Irregular dosing, treatment gaps	Pill organizers, digital reminders, caregiver supervision
	Fear of NSAID adverse effects	Intentional	Risk perception outweighs anticipated analgesic benefit	Dose reduction, early discontinuation	Shared decision-making, risk–benefit counseling
	Use of complementary and alternative medicine	Intentional	Perceived safety of non-pharmacologic alternatives	Reduced persistence with prescribed therapy	Education addressing comparative effectiveness and safety
Therapy-related	Adverse effect profile (GI, CV, renal risks)	Intentional	Tolerability concerns lead to discontinuation	Switching, intermittent use	Individualized therapy selection, topical NSAIDs
	Polypharmacy	Both	Cognitive and logistical burden from multiple medications	Regimen confusion, missed doses	Medication reconciliation, deprescribing where appropriate
	Complex dosing schedules	Both	Increased treatment burden and reduced convenience	Non-persistence	Once-daily or simplified regimens
Healthcare/system	Inadequate patient education	Both	Limited understanding of duration and purpose of therapy	Incorrect PRN vs continuous use	Structured counseling and reinforcement
	Financial constraints	Intentional	Cost burden leads to dose stretching or delayed refills	Reduced persistence	Cost transparency, insurance navigation
	Fragmented care pathways	Both	Lack of coordinated monitoring and follow-up	Poor long-term adherence tracking	Multidisciplinary care models
Downstream consequence	Persistent pain	NA	Inadequate analgesic exposure	Functional limitation	Reassessment including adherence evaluation
	Reduced mobility	NA	Ongoing symptom burden	Loss of independence	Integrated pharmacologic and exercise therapy
	Reduced quality of life	NA	Chronic uncontrolled symptoms	Psychosocial impact	Comprehensive pain management strategy
	Increased healthcare utilization	NA	Treatment instability and therapeutic cycling	Escalation of care, switching	Proactive adherence monitoring

Source: Developed by the authors based on literature synthesis

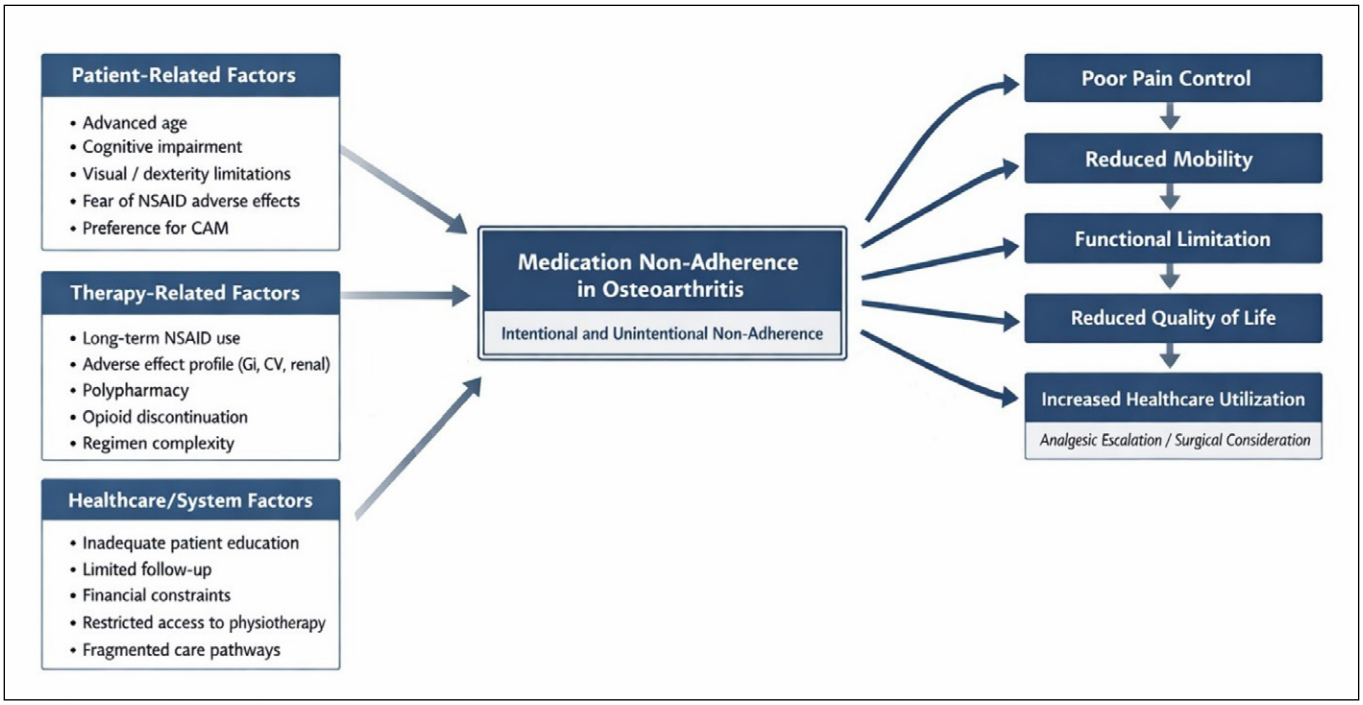

Fig. 2. Conceptual framework illustrating the multidimensional determinants and downstream clinical and healthcare consequences of medication nonadherence in osteoarthritis
Source: Own materials

is a dominant determinant of treatment decisions, sometimes outweighing expected improvements in pain or function [14]. Consequently, some patients independently reduce doses, intermittently use medications, or discontinue therapy without consulting healthcare providers [13, 14].

USE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE

High utilization of complementary and alternative medicine further reflects concerns regarding conventional pharmacotherapy. Cross-sectional data indicate that more than 60 percent of individuals with osteoarthritis report using herbal remedies, dietary supplements, or other alternative approaches for symptom management [15]. Preference for perceived natural or safer therapies, particularly among rural populations and those not consistently taking conventional medications, may reduce adherence to prescribed pharmacologic regimens [15].

THERAPY-RELATED DETERMINANTS

ANALGESIC CLASS AND TOLERABILITY

Medication characteristics influence persistence. Observational evidence from hip and knee osteoarthritis populations demonstrates higher adherence among patients initiated on better tolerated agents such as paracetamol alone or combined with non-steroidal anti-inflammatory drugs, compared with those prescribed opioids, which are associated with earlier discontinuation. Differences in adverse effect profiles and perceived tolerability directly influence continuation patterns.

REGIMEN COMPLEXITY AND POLYPHARMACY

In older adults with multimorbidity, medication regimens are often complex. Multiple prescriptions and dosing schedules increase cognitive and logistical burden. Such complexity contributes to both intentional simplification by patients and unintentional missed doses, particularly in the presence of cognitive or functional limitations [10, 11].

HEALTHCARE SYSTEM AND SOCIOECONOMIC DETERMINANTS

EDUCATION AND COMMUNICATION

Nonadherence is more common among individuals who do not fully understand the benefits, potential side effects, and expected duration of therapy. Limited counselling may leave uncertainty regarding whether medication should be taken continuously or only during symptom exacerbations.

FINANCIAL BARRIERS

Financial factors, including medication cost, are consistently associated with reduced adherence. Economic burden may lead patients to reduce doses or delay refills. Interventions that reduce cost barriers improve adherence outcomes.

LIMITED INTEGRATION OF NONPHARMACOLOGIC CARE

Restricted access to physiotherapy and nonpharmacologic support may weaken treatment engagement. When pharmacologic therapy is not integrated within comprehensive management, patients may question its role or discontinue treatment during fluctuating symptoms.

Taken together, medication nonadherence in osteoarthritis reflects convergence of aging-related vulnerability, cognitive decline, safety concerns, medication tolerability, regimen complexity, financial constraints, and system-level gaps.

The determinants described above rarely operate in isolation. Rather, they interact dynamically within aging populations with multimorbidity, influencing both intentional and unintentional medication-taking behaviors. To conceptualize these interrelationships and their downstream implications, a framework integrating patient-related, therapy-related, and healthcare system determinants with clinical consequences is presented in Figure 2.

Patient-related, therapy-related, and healthcare system factors interact to produce intentional and unintentional nonadherence behaviors. These behaviors contribute to persistent pain, functional decline, reduced quality of life, and increased healthcare utilization, including therapeutic escalation.

CONSEQUENCES OF MEDICATION NONADHERENCE IN OSTEOARTHRITIS

Medication adherence is fundamental to effective osteoarthritis management because pharmacologic therapy is primarily used to reduce pain and preserve function. Although direct longitudinal evidence linking adherence to structural progression remains limited, osteoarthritis-focused observational studies, patient-reported outcomes research, real-world prescribing analyses, and adherence-related interventional studies provide consistent indications of clinical and health service consequences when treatment is inconsistent [19, 23–28, 30].

CLINICAL CONSEQUENCES

Pain is the dominant symptom driving pharmacologic therapy in osteoarthritis. In thumb base osteoarthritis, baseline pain has been associated with adherence patterns, supporting a relationship between symptom burden and treatment behavior [23]. Dissatisfaction with medication effectiveness or tolerability is common and is linked to perceived benefit and safety concerns, reinforcing discontinuation or inconsistent use [25]. In digital self-management programs, baseline pain medication use has been associated with longer duration of high adherence within the program, suggesting clustering of treatment engagement behaviors [19].

Functional limitation in osteoarthritis, including impairment in walking, stair climbing, and daily activities, is closely related to symptom severity. Studies in knee osteoarthritis populations demonstrate strong associations between clinical factors and impaired function and health-related quality of life [28]. Digital self-management research identifies predictors of adherence and engagement and suggests that sustained participation is associated with improved self-reported outcomes, although causal direction may not always be definitively established [24].

Health-related quality of life reflects cumulative effects of pain, mobility restriction, and psychosocial burden. In knee osteoarthritis populations, worse symptoms are consistently associated with poorer quality-of-life scores [28]. Systematic review evidence for exercise and nonpharmacologic interventions indicates that sustained participation improves pain and quality-of-life outcomes [29], reinforcing the broader importance of consistent therapeutic engagement.

Osteoarthritis is characterized by fluctuating symptoms. Real-world prescribing studies demonstrate variable and intermittent nonsteroidal anti-inflammatory drug use patterns among osteoarthritis patients [27]. Although direct longitudinal quantification of adherence-related flare risk remains limited, inconsistent medication-taking plausibly contributes to unstable symptom control in clinical practice.

HEALTHCARE AND ECONOMIC CONSEQUENCES

When symptoms remain uncontrolled, patients frequently seek reassessment. Real-world analyses of nonsteroidal anti-inflammatory drug prescribing and utilization reflect substantial ongoing medication management needs in osteoarthritis populations [27], consistent with frequent healthcare contact.

Variable utilization patterns suggest cycling between agents or adjustment of therapy over time [27]. Persistent pain and disability may lead to escalation of management intensity. Although surgical referral decisions are multifactorial, uncontrolled symptoms remain a central driver of care progression.

Broader osteoarthritis reviews describe the substantial public health and healthcare burden of the disease, including ongoing treatment needs and associated resource consumption [30]. Although adherence-specific cost analyses remain limited, interventions that improve engagement and adherence demonstrate improvements in adherence-related measures and selected clinical outcomes [26], suggesting potential to reduce avoidable healthcare utilization.

Overall, converging evidence indicates that medication nonadherence in osteoarthritis is associated with persistent pain, functional impairment, reduced quality of life, and increased healthcare engagement.

STRATEGIES TO IMPROVE MEDICATION ADHERENCE IN OSTEOARTHRITIS

Medication adherence in osteoarthritis refers to the extent to which medication-taking behavior corresponds with the agreed therapeutic plan. In a single-centre study of patients with knee osteoarthritis, nonadherence reached 55.08 percent [6]. Common contributors include limited understanding, safety concerns, discouragement when improvement is gradual, regimen complexity, multimorbidity, and polypharmacy [6, 33, 36].

PATIENT-CENTERED STRATEGIES

Guideline syntheses emphasize patient-centered care integrating pharmacologic and nonpharmacologic strategies [31,3 2]. Educational discussions should clarify realistic goals, expected time-to-benefit, and risk-benefit considerations. Because avoidance of adverse effects strongly influences treatment preferences [36], addressing safety concerns directly may improve persistence. Shared decision-making aligns therapy selection with patient priorities [31, 32, 36].

Systematic review and meta-analytic evidence across chronic conditions demonstrates overall improvements in medication adherence with mobile application interventions [39]. A randomized controlled trial in older adults with polypharmacy also reported improved adherence following use of a medication management application [37]. In arthritis populations, digital interventions frequently demonstrate positive adherence-related effects, although results vary by intervention design and engagement level [34]. Such tools are best integrated as adjuncts supporting reminders, monitoring, and follow-up [34, 39].

PROVIDER-FOCUSED STRATEGIES

Apparent treatment failure may reflect inconsistent medication use. Expert guidance on nonsteroidal anti-inflammatory drug use in osteoarthritis emphasizes periodic reassessment of treatment response and adherence [33]. Brief standardized tools, including Morisky-type scales used in adherence research, may support structured evaluation when validated for the relevant context [39].

INDIVIDUALIZED TREATMENT PLANNING

Individualized management that accounts for cardiovascular, gastrointestinal, and renal risk enhances safety and acceptability [33]. Topical nonsteroidal anti-inflammatory drugs may reduce systemic exposure when appropriate [35]. Patient-centered framing of pharmacologic options supports confidence and sustained engagement [31, 32, 36].

SYSTEM-LEVEL STRATEGIES

Guideline syntheses recommend integrated care models combining education, pharmacotherapy, physiotherapy referral, and lifestyle interventions [31, 32]. Coordinated follow-up and medication review may reduce fragmentation and support long-term adherence [33].

A cluster-randomized community pharmacy trial reported improved osteoarthritis and pain-management knowledge following pharmacist-led education and medication review, with modest improvements in pain scores [38]. This supports pharmacist integration within multidisciplinary osteoarthritis management [38].

Digital interventions in arthritis populations frequently demonstrate adherence-related benefits, though outcomes vary according to engagement and integration into care [34]. Broader chronic disease meta-analytic evidence supports overall adherence benefits from app-based interventions [39]. Digital approaches are therefore best framed as complements to clinician follow-up rather than replacements [34, 39].

The determinants, mechanisms, downstream consequences, and adherence-enhancing strategies discussed throughout this review are closely interconnected rather than occurring in isolation. Patient vulnerability, medication characteristics, and healthcare system factors converge to shape intentional and unintentional medication-taking behaviors, which subsequently influence symptom stability, functional outcomes, and healthcare utilization. To provide an integrated synthesis of these multidimensional relationships and their corresponding intervention targets, Table 1 summarizes key determinants, mechanistic pathways, clinical consequences, targeted strategies, and representative supporting evidence.

This table provides an integrated synthesis of patient-related, therapy-related, and healthcare system determinants of medication nonadherence in osteoarthritis. For each determinant, corresponding mechanistic pathways, downstream clinical and healthcare consequences, and targeted intervention strategies are outlined. The framework reflects thematic integration of the evidence discussed throughout this review.

CONCLUSIONS

Medication nonadherence in osteoarthritis represents a multifactorial and clinically consequential challenge that directly influences symptom control, functional outcomes, and healthcare utilization. As synthesized in this review, nonadherence arises from interacting patient-related, therapy-related, and healthcare system determinants, often reflecting both intentional and unintentional behaviors. Its consequences extend beyond persistent pain to include functional decline, reduced quality of life, therapeutic escalation, and increased economic burden. Importantly, nonadherence remains insufficiently addressed in routine clinical practice, despite its central role in determining real-world treatment effectiveness.

FUTURE DIRECTIONS

Future research should focus on standardizing adherence assessment methods specific to osteoarthritis populations and conducting high-quality prospective studies evaluating multimodal, patient-centered adherence interventions. Greater integration of digital health tools, pharmacist-led models, and structured behavioral strategies may offer scalable solutions. Additionally, incorporating adherence outcomes into clinical trials would provide a more accurate representation of therapeutic effectiveness in real-world settings. Recognizing medication adherence as a therapeutic target rather than a peripheral issue is essential to improving long-term outcomes in osteoarthritis care.

REFERENCES

1. Sharma L. Osteoarthritis of the Knee. N Engl J Med. 2021 Jan 7;384(1):51-59. doi:10.1056/NEJMcp1903768. DOI
2. Shalhoub M, Anaya M, Deek S, Zaben AH, Abdalla MA, Jaber MM, et al. The impact of pain on quality of life in patients with osteoarthritis: a cross-sectional study from Palestine. BMC Musculoskelet Disord. 2022 Mar 14;23(1):248. doi:10.1186/s12891-022-05207-x. DOI
3. Kumar T, Pandey V, Kumar A, Elhence A, Choudhary V. Quality of life and self-reported disability in patients with osteoarthritis: Cross-sectional descriptive study. J Educ Health Promot. 2023 Mar 31;12:81. doi:10.4103/jehp.jehp_1055_22. DOI
4. Geng R, Li J, Yu C, Zhang C, Chen F, Chen J, et al. Knee osteoarthritis: Current status and research progress in treatment (Review). Exp Ther Med. 2023 Aug 25;26(4):481. doi:10.3892/etm.2023.12180. DOI
5. Allaham KK, Feyasa MB, Govender RD, Musa AMA, AlKaabi AJ, ElBarazi I, et al. Medication Adherence Among Patients with Multimorbidity in the United Arab Emirates. Patient Prefer Adherence. 2022 May 6;16:1187-1200. doi:10.2147/PPA.S355891. DOI
6. Zhang Q, Li J, Yao Y, Hu J, Lin Y, Meng X, et al. The development of a clinical nomogram to predict medication nonadherence in patients with knee osteoarthritis. Medicine (Baltimore). 2023 Aug 4;102(31):e34481. doi:10.1097/MD.0000000000034481. DOI
7. Ahn SH, Park SY, Kwak MK, Ha YC, Kim TY, Kim HY. Factors Associated With Compliance and Persistence With Pharmacotherapy in Patients With Osteoporosis: A Nationwide Cohort Study in Korea. J Korean Med Sci. 2025 May 12;40(18):e72. doi:10.3346/jkms.2025.40.e72. DOI
8. Al-Qerem W, Jarab A, Eberhardt J, Abdo S, Al-Sa'di L, Al-Shehadeh R, et al. Medication adherence among Jordanian adults with chronic conditions: a combined analysis using regression and machine learning. Ann Med. 2025 Dec;57(1):2548979. doi:10.1080/07853890.2025.2548979. Epub 2025 Aug 20. PMID:40833816; PMCID:PMC12369517. DOI
9. Sen R, Hurley JA. Osteoarthritis. [Updated 2023 Feb 20]. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. https://www.ncbi.nlm.nih.gov/books/NBK482326/ (Access: Dcecember 2025).
10. World Health Organization. Ageing and health. World Health Organization. 2024. https://www.who.int/news-room/fact-sheets/detail/ageing-and-health (Access: Dcecember 2025).
11. Svitlica BB, Radovanović A, Obrenov L, Hromiš S. Experiences of Visually Impaired Individuals in Self-Administering Prescription Medications: A Cross-Sectional Study. J Adv Nurs. 2025 Sep 16. doi:10.1111/jan.70223. Guo R, Ou YN, Ma LY, Tang L, Yang L, Feng JF, et al. Osteoarthritis, osteoarthritis treatment and risk of incident dementia: a prospective cohort study based on UK Biobank. Age Ageing. 2024 Aug 6;53(8):afae167. doi:10.1093/ageing/afae167. DOI
12. JiaoYi P, YongQi S, KeChun G, XingYu L, ZeZhong L, Jin Shuai D, et al. Assessing the efficacy and safety of different nonsteroidal anti-inflammatory drugs in the treatment of osteoarthritis: A systematic review and network meta-analysis based on RCT trials. PLoS One. 2025 May 7;20(5):e0320379. doi:10.1371/journal.pone.0320379. DOI
13. Barker KL, Toye F, Seers K. A synthesis of qualitative research to understand the complexity behind treatment decision-making for osteoarthritis. Osteoarthr Cartil Open. 2023 Mar 15;5(2):100355. doi:10.1016/j.ocarto.2023.100355. DOI

14. Wang Z, Jones G, Blizzard L, Aitken D, Zhou Z, Wang M, et al. Prevalence and correlates of the use of complementary and alternative medicines among older adults with joint pain. Int J Rheum Dis. 2023 Sep;26(9):1760-1769. doi:10.1111/1756-185X.14822. Epub 2023 Jul 11. PMID:37431712. DOI
15. Shih CH, Kao CW, Huang YC, Chen YH, Tsai MY. Complementary and Alternative Medicine Use for Knee Osteoarthritis by Older Adults in Rural Settings in Southern Taiwan. J Nurse Pract. 2025 Nov 1;21(10):105570. doi:10.1016/j.nurpra.2025.105570. DOI
16. Jaber M, Hamza W, Asab TA, et al. Prevalence of complementary and alternative medicine use among osteoarthritis patients in a developing country and their level of satisfaction. Sci Rep. 2026. doi:10.1038/s41598-026-37826-y. DOI
17. da Costa BR, Pereira TV, Saadat P, Rudnicki M, Iskander SM, Bodmer NS, et al. Effectiveness and safety of non-steroidal anti-inflammatory drugs and opioid treatment for knee and hip osteoarthritis: network meta-analysis. BMJ. 2021 Oct 12;375:n2321. doi:10.1136/bmj.n2321. DOI
18. Dahlberg LE, Rowland SP, Pearson JT, Lohmander LS, Kiadaliri A. Baseline pain medication is associated with longer duration of high adherence in a three-month digital treatment program for hip and knee osteoarthritis. Osteoarthr Cartil Open. 2025 Dec 11;8(1):100727. doi:10.1016/j.ocarto.2025.100727. DOI
19. Al-Aqeel S, Alsugair J, Alghamdi R. Economic evaluation of interventions to improve medication adherence among patients with chronic diseases: an overview of systematic reviews. Expert Rev Pharmacoecon Outcomes Res. 2023 Feb;23(2):153-179. doi:10.1080/14737167.2023.2161516. DOI
20. Katende-Kyenda LN. The critical role of medicine adherence in management of chronic conditions: a review article. J Mind Med Sci. 2026;13(1):2. doi:10.3390/jmms13010002. DOI
21. Patel S, Huang M, Miliara S. Understanding Treatment Adherence in Chronic Diseases: Challenges, Consequences, and Strategies for Improvement. J Clin Med. 2025 Aug 26;14(17):6034. doi:10.3390/jcm14176034. DOI
22. Duong V, Nicolson PJ, Robbins SR, Deveza LA, Wajon A, Jongs R, et al. High baseline pain is associated with treatment adherence in persons diagnosed with thumb base osteoarthritis: An observational study. J Hand Ther. 2022 Jul-Sep;35(3):447-453. doi:10.1016/j.jht.2021.04.024. DOI
23. Kiadaliri A, Dell'Isola A, Lohmander LS, Hunter DJ, Dahlberg LE. Assessing the importance of predictors of adherence to a digital self management intervention for osteoarthritis. J Orthop Surg Res. 2023 Feb 13;18(1):97. doi:10.1186/s13018-023-03562-6. DOI
24. Robinson RL, Schnitzer TJ, Barlow S, Berry M, Bushmakin AG, Cappelleri JC, et al. Satisfaction with Medications Prescribed for Osteoarthritis: A Cross-Sectional Survey of Patients and Their Physicians in the United States. Pain Ther. 2022 Mar;11(1):191-208. doi:10.1007/s40122-021-00350-0. Epub 2022 Jan 13. DOI
25. Ebaid AM, Mortada MA, Abd-Ghani FA, Ali SA. Impact of Health Education Programme on Adherence to Treatment in Knee Osteoarthritis: An Interventional Study on Egyptian Patients. Musculoskelet Care. 2024 Dec;22(4):e1954. doi:10.1002/msc.1954. DOI
26. Ide J, Shoaibi A, Wagner K, Weinstein R, Boyle KE, Myers A, et al. Patterns of Comorbidities and Prescribing and Dispensing of Non-steroidal Anti-inflammatory Drugs (NSAIDs) Among Patients with Osteoarthritis in the USA: Real-World Study. Drugs Aging. 2024 Apr;41(4):357-366. doi:10.1007/s40266-024-01108-x. DOI
27. Tekaya AB, Bouzid S, Kharrat L, Rouached L, Galelou J, Bouden S, et al. Health-Related Quality of Life and Associated Factors Among Patients With Knee Osteoarthritis. Curr Rheumatol Rev. 2023 Jun 5;19(3):355-361. doi:10.2174/1573397119666230201152219. DOI
28. Nayab S, Bilal Elahi M. The Impact of Exercise Interventions on Pain, Function, and Quality of Life in Patients With Osteoarthritis: A Systematic Review and Meta-Analysis. Cureus. 2024 Nov 25;16(11):e74464. doi:10.7759/cureus.74464. DOI
29. Courties A, Kouki I, Soliman N, Mathieu S, Sellam J. Osteoarthritis year in review 2024: Epidemiology and therapy. Osteoarthritis Cartilage. 2024;32(11):1397-1404. doi:10.1016/j.joca.2024.07.014. DOI
30. Conley B, Bunzli S, Bullen J, O'Brien P, Persaud J, Gunatillake T, et al. Core Recommendations for Osteoarthritis Care: A Systematic Review of Clinical Practice Guidelines. Arthritis Care Res (Hoboken). 2023 Sep;75(9):1897-1907. doi:10.1002/acr.25101. DOI
31. Overton C, Nelson AE, Neogi T. Osteoarthritis Treatment Guidelines from Six Professional Societies: Similarities and Differences. Rheum Dis Clin North Am. 2022 Aug;48(3):637-657. doi:10.1016/j.rdc.2022.03.009. DOI
32. Magni A, Agostoni P, Bonezzi C, Massazza G, Menè P, Savarino V, et al. Management of Osteoarthritis: Expert Opinion on NSAIDs. Pain Ther. 2021 Dec;10(2):783-808. doi:10.1007/s40122-021-00260-1. DOI
33. Gajadhur K, Patil R, Anadachee AP, Kashyap A, Banerjee I. Effectiveness of Digital Health Intervention in Enhancing Medication Adherence Among Arthritis Patients: A Systematic Review of Randomized Controlled Trials. Nepal J Epidemiol. 2025 Sep 1;14(4):1362-1373. doi:10.3126/nje.v14i4.77347. DOI
34. Shi C, Ye Z, Shao Z, Fan B, Huang C, Zhang Y, et al. Multidisciplinary Guidelines for the Rational Use of Topical Non-Steroidal Anti-Inflammatory Drugs for Musculoskeletal Pain (2022). J Clin Med. 2023 Feb 15;12(4):1544. doi:10.3390/jcm12041544. DOI
35. Al-Omari B, Farhat J, Khan M, Grancharov H, Zahr ZA, Hanna S, et al. Exploring patient treatment decision making for osteoarthritis in the UAE: a cross-sectional adaptive choice-based conjoint study. BMC Public Health. 2023 Aug 12;23(1):1542. doi:10.1186/s12889-023-16490-1. DOI

36. Poorcheraghi H, Negarandeh R, Pashaeypoor S, Jorian J. Effect of using a mobile drug management application on medication adherence and hospital readmission among elderly patients with polypharmacy: a randomized controlled trial. BMC Health Serv Res. 2023 Nov 2;23(1):1192. doi:10.1186/s12913-023-10177-4. DOI
37. Thapa P, Kc B, Gyawali S, Leong SL, Mohamed Ibrahim MI, Lee SWH, et al. Effectiveness of community pharmacist-led interventions in osteoarthritis pain management: A cluster-randomized trial. Res Social Adm Pharm. 2024 Feb;20(2):149-156. doi:10.1016/j.sapharm.2023.10.012. DOI
38. Lanke V, Trimm K, Habib B, Tamblyn R. Evaluating the Effectiveness of Mobile Apps on Medication Adherence for Chronic Conditions: Systematic Review and Meta-Analysis. J Med Internet Res. 2025 Jul 31;27:e60822. doi:10.2196/60822. DOI

CONFLICT OF INTEREST
The Authors declare no conflict of interest

CORRESPONDING AUTHOR
Abubakker Siddiq Mohamed Hameed
Medical University of Lublin,
Lublin, Poland
e-mail: bakkersf2@gmail.com

ORCID AND CONTRIBUTIONSHIP
Ariba Juayria Zubair: 0009-0007-0214-0356 B D E F
Abubakker Siddiq Mohamed Hameed: 0009-0007-9822-1440 A D E F
Sandhra Treesa Santhosh: 0009-0003-1913-0024 B D F
Mamoun Abdulhamid Jarjouma: 0009-0006-4640-9882 B D F
Parvathy Jyothish: 0009-0008-6037-4641 B D F
Mateusz Kaczmarski: 0009-0000-9215-5656 E F
Silvija Ille: 0009-0000-9842-3834 E F

A – Work concept and design, B – Data collection and analysis, C – Responsibility for statistical analysis, D – Writing the article, E – Critical review, F – Final approval of the article

RECEIVED: 30.01.2026
ACCEPTED: 28.02.2026