



ANTI-INFLAMMATORY AND MEDITERRANEAN DIET APPROACHES IN ARTHRITIS MANAGEMENT

General Medicine

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ABSTRACT

Introduction: Arthritis is an inflammatory disorder which is chronic and results in stiffness, joint pain, and structural deterioration. Nutritional adjustment has become a viable complement to standard therapy because it has the potential to decrease systemic inflammation. The current review determines the importance of anti-inflammatory and Mediterranean diets in alleviating arthritis symptoms and biomarkers of inflammation. **Methods:** A Narrative review was conducted by using peer-reviewed articles published in 2020-24. Publisher databases PubMed Central, Google Scholar and large medical journals were searched to obtain free full-text articles. The inclusion criteria were randomised controlled trials, cohort studies, systematic reviews, and meta-analyses of the outcomes of dietary interventions on arthritis symptoms or inflammation. **Results:** It is demonstrated that polyphenols, omega-3 fatty acids, monounsaturated fats, and antioxidant diets tremendously diminish inflammatory profiles of CRP, IL-6, and TNF- α . The Mediterranean diet is the one that can always ameliorate pain, stiffness, physical performance, and inflammatory biomarkers of rheumatoid arthritis (RA) and osteoarthritis (OA). There are also benefits of anti-inflammatory diets, but these have been mixed because of disparities in the definition of the diet used in various studies. **Conclusion:** Anti-inflammatory and Mediterranean diets are effective and safe, and evidence-based complementary interventions for arthritis management. They assist in the decrease of inflammation, improvement of the clinical symptoms, and generally in the improvement of the quality of life. Further clinical trials are needed over a long period of time in order to develop standard dietary guidelines to manage arthritis.

KEYWORDS

Mediterranean diet; anti-inflammatory diet; arthritis management; inflammation

INTRODUCTION

Arthritis is a global illness with millions of people being affected, and it is one of the most common disability causes. There are two most frequent forms of these osteoarthritis (OA) and rheumatoid arthritis (RA), both of which are associated with chronic inflammation and degeneration of the joints. Conventional treatment involves pharmacotherapy, physical treatment, and in severe situations, surgery (Wen et al., 2023). More focus has increasingly been placed on nutritional interventions with the ability to decrease inflammation and dampen the disease course. The presence of antioxidants, fibre and unsaturated fatty acids has seen the promise of the anti-inflammatory as well as Mediterranean diets. The paper examines scientific findings on the effectiveness of these dietary habits in enhancing clinical outcomes for people with arthritis.

METHODS

Peer-reviewed works published in 2020-24 were analysed in the form of a narrative review. The sources were free full-text articles in PubMed Central, Google Scholar, and the most popular medical journals. The keywords to be used were Mediterranean diet, anti-inflammatory diet, arthritis, rheumatoid arthritis, osteoarthritis, and dietary interventions. Requested inclusion criteria included randomised controlled trials, cohort studies, systematic reviews, and meta-analyses that included human subjects and evaluated the dietary effect on the symptoms of arthritis or inflammation. The exclusion criteria were animal studies, articles that were published before 2020, and articles without the complete text.

A further screening of the reference lists of important review articles was also done manually to detect any other relevant studies not detected during the database searches. The extraction of data was based on the study population features, dietary regimens, intervention term, outcome measures (pain scores, inflammatory biomarkers, functional improvement), and the quality of the methods. There was no formal meta-analysis, but results were synthesised in a narrative fashion in order to focus on patterns of consistency and contradictions in studies. This method levelled widespread coverage of existing evidence and preserved the flexibility that comes with the narrative review methodology.

RESULTS

Anti-Inflammatory Diet Effects

The anti-inflammatory diets focus on vegetables, whole grains, legumes, nuts, and fatty fish with reduced refined sugars and processed meat products. It has been shown that these diets lower signs of inflammation.

- A systematic review conducted in 2022 revealed that in the case of RA patients, anti-inflammatory diets caused a decrease in the level of CRP, IL-6, and TNF-alpha (Schoenenberger et al., 2021).
- There is moderate pain and morning stiffness improvement, and more when patients stick to changes in diet.
- Oxidative stress markers, decreased by high-polyphenol foods (berries, green tea, turmeric, ginger), could be measured (Rudrapal et al., 2022).

Table 1: Evidence Summary of Anti-Inflammatory Dietary Components and Their Effects on Arthritis Outcomes

Dietary Component / Intervention	Key Nutritional Elements	Primary Mechanisms of Action	Observed Clinical Outcomes in Arthritis	Supporting Evidence (2021–2022)	Strength of Evidence
Anti-inflammatory dietary pattern (overall diet model)	Vegetables, whole grains, legumes, nuts, fatty fish; reduced refined sugars and processed meats	Downregulation of NF- κ B pathways; decreased production of pro-inflammatory cytokines	Overall reduction in systemic inflammation; improved symptom control	Schoenenberger et al. (2021) systematic review	High (multiple RCTs aggregated)
Effect on inflammatory biomarkers in RA	Omega-3 fatty acids, fiber, plant antioxidants	Reduced circulating CRP, IL-6, TNF- α levels	Significant reduction in inflammatory markers among RA patients	Schoenenberger et al. (2021)	High
Diet adherence and symptom improvement	Consistency of dietary pattern adherence	Sustained modulation of inflammatory pathways; improved metabolic health	Moderate improvement in pain and morning stiffness; greater benefits with high adherence	Evidence from multiple intervention studies	Moderate–High
High-polyphenol food components (berries, turmeric, green tea, ginger)	Polyphenols, flavonoids, curcuminoids	Antioxidant effects; inhibition of oxidative stress; suppression of ROS-mediated joint damage	Measurable decreases in oxidative stress markers; improved joint comfort	Rudrapal et al. (2022)	Moderate

Mediterranean Diet Outcomes

The most examined dietary intervention for arthritis is the Mediterranean diet (MedDiet), which is a diet high in olive oil, vegetables, legumes, nuts, fish, and whole grains.

The significant clinical results are:

- **Reduction in pain and stiffness:** A randomised controlled trial in 2020 has noticed a significant decrease in Disease Activity Score-

28 (DAS28) in RA patients on a MedDiet (Nelson et al., 2020).

- **Better physical functioning:** Patients stated that they were much more active and relied less on painkillers.
- **Lower inflammatory biomarkers:** Multiple studies demonstrate decreases in CRP and ESR in those who have adhered to the Mediterranean diet pathway in 12 weeks.
- **Weight management benefits:** Joint load and mobility of OA patients are better when weight loss is by 5%.

Table 2: Clinical Outcomes Of Mediterranean Diet Interventions In Arthritis Management

Outcome Domain	Description of Effect	Evidence Type / Key Study Findings	Measured Indicators
Pain and Stiffness Reduction	Consistent improvement in joint pain, morning stiffness, and disease activity	Randomised controlled trial (Nelson et al., 2020) reported significant reductions in DAS28 among RA patients following a 12-week Mediterranean diet intervention.	Disease Activity Score-28 (DAS28); patient-reported pain scores; visual analogue scale (VAS)
Improved Physical Functioning	Enhanced mobility, reduced dependence on analgesics, and improved daily functioning	Multiple clinical studies indicate that patients experience better functional outcomes and reduced disability when adhering to the Mediterranean diet.	Health Assessment Questionnaire (HAQ); functional mobility assessments; analgesic usage frequency
Lower Inflammatory Biomarkers	Attenuation of systemic inflammation through nutrient-rich, anti-inflammatory dietary components	Studies consistently demonstrate decreases in C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) after 12 weeks of adherence to the diet.	CRP (mg/L); ESR (mm/hr); cytokine levels (IL-6, TNF-α)
Weight Management and Joint Load Benefits	Weight reduction and improved biomechanical efficiency on weight-bearing joints, particularly beneficial in OA	Evidence shows that even a 5% reduction in body weight improves joint mobility, reduces pain, and decreases mechanical stress on arthritic joints.	Body Mass Index (BMI); gait speed; joint load assessments; WOMAC mobility scores

Mechanisms Of Action

The anti-inflammatory and the Mediterranean diets have similar biological pathways:

- Omega-3 fatty acids decrease the presence of inflammation in joints through cyclooxygenase (COX) pathways (Calder, 2020).
- Antioxidants counter reactive oxygen species that cause

degradation of the cartilage.

- Monounsaturated fats from olive oil exhibit anti-inflammatory effects via downregulation of NF-κB signalling (Tamburini et al., 2025).
- Microbiome regulation of the gut leads to reduced systemic inflammation.

Table 3: Shared Biological Mechanisms of Anti-Inflammatory and Mediterranean Diets

Mechanism	Dietary Components Involved	Biological Pathway	Outcome on Arthritis Pathophysiology	Key Sources
Modulation of Eicosanoid Production	Omega-3 fatty acids (EPA, DHA) from fatty fish, nuts, seeds	Inhibition of COX-2 and reduction of arachidonic-acid-derived pro-inflammatory mediators	Decreased joint inflammation and synovial cytokine release	Calder (2020)
Reduction of Oxidative Stress	Polyphenols and antioxidants from berries, green tea, turmeric, extra-virgin olive oil	Neutralisation of reactive oxygen species; increased endogenous antioxidant enzyme activity	Reduced oxidative cartilage damage and slower joint degeneration	Rodríguez-López et al. (2020)
NF-κB Pathway Suppression	Extra-virgin olive oil rich in oleic acid and oleocanthal	Downregulation of NF-κB signalling and inflammatory gene transcription	Lower IL-6, TNF-α and pro-inflammatory cytokines	Tamburini et al. (2025)
Gut Microbiome Regulation	High-fibre foods, legumes, whole grains, fermented foods	Increased short-chain fatty acids (SCFAs); improved microbial diversity and mucosal immunity	Reduced systemic inflammation relevant to OA/RA	Cundra et al. (2022)

Comparative Efficacy

- High-quality evidence in favour of improving the symptoms of arthritis is more powerful in the Mediterranean diet.
- Diets to reduce inflammation present promising results, although

they are less predictable because of the various definitions given in different studies.

- Both diets are superior to Western dietary patterns, which have a lot of saturated fats and sugar.

Table 4: Comparative Efficacy Of Mediterranean And Anti-inflammatory Diets In Arthritis Management

Parameter	Mediterranean Diet	Anti-Inflammatory Diet	Western Diet (Comparator)
Strength of Evidence	Supported by large RCTs, longitudinal studies, and multiple systematic reviews; consistent findings across OA and RA populations.	Evidence emerging from smaller trials and heterogeneous studies; effectiveness varies due to differences in diet definitions.	Limited or negative evidence; strongly associated with worsening inflammatory profiles.
Clinical Outcomes	Significant reductions in pain, stiffness, ESR, CRP, DAS28 scores; improved physical function and quality of life.	Moderate reductions in inflammatory biomarkers and subjective pain scores; results less consistent across populations.	Often linked to increased pain, systemic inflammation, fatigue, and rapid progression of arthritis symptoms.

Dietary Composition Stability	Well-defined and culturally stable dietary pattern with reproducible components (e.g., olive oil, legumes, fish).	Broad and variable; definitions differ across studies, reducing reproducibility and comparability of outcomes.	High variability but consistently high in saturated fats, refined sugars, and processed foods.
Inflammatory Pathway Impact	Strong inhibition of NF- κ B pathways, reduction in oxidative stress, modulation of gut microbiota diversity, and high omega-3 intake.	Reduces COX-mediated inflammation through polyphenols and antioxidants, but mechanistic effects vary with food choices.	Promotes oxidative stress, adipose-derived inflammation, dysbiosis, and elevated pro-inflammatory cytokines (IL-6, TNF- α).
Predictability and Generalisability of Outcomes	High predictability across demographics due to standardised pattern and strong empirical evidence.	Moderate predictability; outcomes influenced by adherence levels and wide-ranging interpretations of “anti-inflammatory.”	Predictably poor outcomes for inflammatory diseases across diverse populations.

DISCUSSION

The results demonstrate the great promise of dietary interventions with regard to the management of arthritis. Med diet shows a steady boost in clinical and biochemical results and especially in patients with RA. Its even structure of omega-3 fatty acids, antioxidants, polyphenols and monounsaturated fats has potent anti-inflammatory properties. One of its main constituents, olive oil, includes oleocanthal, which is also a COX-inhibitor like ibuprofen.

Anti-inflammatory diets are very flexible but may be diverse with cultural and individual inclinations. Even with this variation, some of the common core components include high intake of plant-based foods and reduced intake of processed foods, which are more similar to the Mediterranean diet. This fact indicates that anti-inflammatory diets can act as an available base to patients whose facility does not allow them to adopt the Mediterranean diet completely.

Weight management is also essential. Mechanical stress on joints and the inflammatory action of fat tissue by obesity a risk factors for the severity of arthritis. The Mediterranean diet and the anti-inflammatory diet have been demonstrated to aid in the process of healthy weight loss, which can be effective on its own in the alleviation of arthritic symptoms.

Barriers such as affordability, food supply, and long-term behaviour change should be discussed. The clinicians need to focus on personalised nutrition counselling and culturally suitable adjustments. All in all, dietary interventions, pharmacologic, and physical therapy are effective to complement each other to manage arthritis.

CONCLUSION

Anti-inflammatory and Mediterranean diets are also evidence-based, effective interventions in alleviating the symptoms of arthritis, as well as systemic inflammation. The Mediterranean diet, which has strong clinical evidence, is always beneficial in relieving the pain, stiffness, physical disability, and inflammatory biomarkers of OA and RA. The use of anti-inflammatory diets is also beneficial because it focuses on whole and nutrient-rich foods. These diets can be viewed as important elements of whole-body care of arthritis due to the safety they present and the numerous health benefits. More extended clinical studies are required to make some standardised guidelines and evaluate the long-term benefits.

Additionally, there exists an ever-growing amount of data, proving the fact that the individuals in question, following such eating patterns, will feel more energetic, experience fewer swollen and strained joints, and their overall well-being will be higher. Such benefits of diet modification render it viable and less risky as a complement to standard care; the dietary changes are bound to motivate the patients to adopt long-term sustainable lifestyle changes that will enable them to curb arthritis.

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