
A Review of Reviews: Commentary on the Role of Nutrition in Managing Rheumatic Conditions

By Inez Martincevic, RD, MSc

Beyond the traditional definition of “diet,” there is much interest and discussion among both patients and clinicians regarding the role of foods and nutrients in the pathogenesis of and immune-modulating effects on autoimmune diseases, including rheumatoid arthritis (RA), osteoarthritis (OA), systemic lupus erythematosus (SLE), ankylosing spondylitis (AS) and other rheumatic conditions. The purpose of this commentary is to evaluate the current evidence for the role of diet and nutrients in the management of rheumatic conditions across all ages.

The mechanism by which autoimmune conditions develop remains to be elucidated. However recent studies and reviews share insights about the role of the microbiome in human disease. Of particular interest is the gut microbiome, and the potential to modify it with diet as a means to alter immune responses to the environment and, in turn, disease progression and/or activity.¹⁻⁴

This data, together with epidemiological evidence, suggests an increased risk of developing RA with overweight/obesity, vitamin D deficiency, as well as diets rich in red meat, processed sugars, and limited in fruits, vegetables, whole grains, fibers and omega-3 fatty acids. Collectively the data suggests that diet can be an adjunctive therapy in managing rheumatic conditions.⁵⁻⁹

Furthermore, patients with autoimmune diseases are keen to implement lifestyle interventions as holistic or complementary means to manage disease. Diet and nutrients are often perceived by patients as natural, safe and effective.¹⁰⁻¹² Albeit, while food and nutrients are considered a part of the environment that one can control and alter, not all diets or supplements are necessarily beneficial for rheumatic conditions. As well, some diets can be limiting in nutrients and could compromise nutritional status and/or be linked with other comorbidities. As well, there is little evidence that food or nutrients can displace current approaches to treat disease.

Dietary patterns of Canadians

Increasing rates of overweight and obesity globally, as well as the associations between poor dietary intake and chron-

ic diseases like rheumatic conditions, have stimulated researchers to evaluate dietary patterns.¹³ Studies suggest that eating habits in industrialized nations have moved to highly processed convenience foods, which generally are not considered nutritionally dense options or choices that support optimal health.^{14,15} Canadian-specific data supports such conclusions. Between 2007-2014, Canadians reported a frequency of fruit and vegetable intake that was consistently below recommended servings, as advised by Canada's Food Guide to Healthy Eating.¹⁶ Canadians consume more calories from snacks daily than breakfast.¹⁵ Snacks have been estimated to contribute to almost 23% of total energy intake among Canadians, a decent proportion of calories, which may not be healthy choices.¹⁷ Additionally, based on the 2015 Canadian Community Health Survey, 63.5% of children and adolescents, as well as 59.2% of adults, consume diets that contain less than 20% of their total daily grain intake as whole grains, well below recommended.¹⁸ Despite these data, 46% of Canadians believe they have excellent/very good eating habits.¹³ Healthy eating patterns among Canadians can be optimized. Healthy eating patterns, like those advised by the recently updated Food Guide in Canada, might help with weight issues, important in managing OA, but also potentially help patients with rheumatic conditions feel better.¹⁹⁻²¹

Overweight/obesity

Countless studies have shown that weight reduction in overweight/obese patients with OA reduces joint pain and improves inflammation, thought to be driven by the adipokine secretion pathways.²² Excessive body weight is associated with developing RA and may also exacerbate symptoms in RA²⁷, which may parallel other rheumatic conditions. There is much literature evaluating weight loss strategies as overweight/obesity impacts many chronic diseases. If weight loss is a goal, caution is advised, as some weight loss diets may not be effective, may be associated with other comorbidities, and may not be sustainable long term. Of particular interest are the Paleolithic diet (rich in vegetables, fruits, nuts, eggs, fish and lean meats; excludes refined sug-

ar salt, dairy and grains),²⁸ ketogenic diet (rich in fats and proteins; limited in grains and processed foods),²⁹ intermittent fasting (assumes a healthy diet but little or no food/drink are consumed over 16-24 hours),^{30,31} or low calorie/fat diets (calorie restricted or fat restricted).^{30,31} While it is well known that achieving an ideal body weight/body composition is important for health and should always be considered when counselling patients about disease, further studies evaluating which dietary approach will attain and maintain a healthy body weight, ideally without much restriction, as well as demonstrate a therapeutic benefit in other rheumatic conditions, need to be described.

Elemental diets

Elemental diets remove food antigens thought to be associated with an immune response and provide nutrition in the form of amino acids, thus removing the antigenic properties of proteins, and mono- and/or di-saccharides, fats and micronutrients as a formula to meet nutritional needs. While this therapy has been proven effective in treating other immune conditions, such as eosinophilic esophagitis and, decades ago, inflammatory bowel disease,^{23, 24} recent reviews have highlighted that elemental diets have only been studied in RA and not all patients benefited from the intervention.²⁵⁻²⁷ Further studies are required to determine if elemental diets can be therapeutic in rheumatic conditions, as well as what to do in the long term, as elemental diets are not considered sustainable.

Elimination diets

Elimination diets remove food(s) thought to be pro-inflammatory which may affect disease activity. This can include removing one and/or more foods such as dairy, nightshade vegetables (members of the Solanaceae family including tomatoes, potatoes, eggplant, bell and chili peppers) and animal sources of food. Foods are removed and/or reintroduced to monitor disease response. Recent reviews evaluating the benefit of elimination diets highlight that data are conflicting; some diets, like the vegetarian and vegan diet, were associated with a significant improvement in symptoms associated with RA and AS, while other results show no significant difference in disease response among patients following these diets compared to control groups.²⁵⁻²⁷

Heterogeneity, limited studies and subjective responses are considered the limiting factors to recommending elimination diets for treatment of rheumatic conditions. Still, patients may report positive symptoms with eliminations and may choose to adhere to food restrictions. As well, plant-based diets may be undertaken for healthy eating, or for other reasons, such as religion or environmental sustainability. In such cases, clinicians are encouraged to be supportive and foster patient-centered as well as holistic

care. In doing so, clinicians should assess diets for nutritional adequacy and monitor nutritional status, because elimination diets, especially veganism, can be limiting in vital nutrients including protein, iron, B-vitamins, calcium and zinc, important for optimal growth in children and for overall health in adults.

The gluten-free diet can be considered a type of elimination diet (all sources of gluten, a protein found naturally in wheat, barley, rye and triticale, are removed). Sometimes processed foods with added gluten as an ingredient are eliminated. Studies have shown similarities between RA, SLE, and undifferentiated connective tissue disease, and celiac disease with respect to clinical, epidemiological, pathophysiological and non-HLA genetic aspects.³²⁻³⁴ Thus screening for celiac disease in rheumatic conditions is warranted, especially in RA, SLE and connective tissue disorders, where a greater prevalence of celiac disease has been reported, even when there are no gastrointestinal symptoms.^{27, 33-34} Studies evaluating the effect of a gluten-free diet in rheumatic conditions are limited because patients may report feeling better secondary to gluten sensitivity/intolerance.³⁵ Although the role of gluten as a disease-modifying factor in rheumatic conditions is unknown, exploring the effectiveness of a gluten-free diet in rheumatic conditions holds potential to manage disease.

The Mediterranean diet

The Mediterranean diet (rich in olive oil/omega-3 fatty acids, vegetables, fruits, whole grains, legumes, nuts, seeds; moderate in fish, shellfish, white meat, plain fermented dairy [yogurt, cheese], wine; limited in red meat, processed meats, sugar) has been associated with a significant reduction in pain, swelling, stiffness and disease activity in RA and psoriatic arthritis, but has not been shown to influence disease prevention.^{11, 36-39} The Mediterranean diet may have a role in other rheumatic conditions, but data are scant. Overall the Mediterranean diet follows principles of general healthy eating and overlaps with a diet that would be associated with a lower risk of developing RA and perhaps other rheumatic conditions. Reviews highlight that the Mediterranean diet as adjunctive therapy can help manage RA and psoriatic arthritis; however higher quality and long-term studies are warranted, including more studies in other rheumatic conditions.

Supplements

Omega-3 fatty acids (eicosapentaenoic acid [EPA], docosahexaenoic acid [DHA], marine-sourced, versus alpha-linolenic acid [ALA], plant-sourced), provided as fish oil supplements appear to be safe and effective agents in managing RA and SLE, less so in OA.⁴⁰⁻⁴² However bleeding risk with omega-3 fatty acids has been described⁴³ and

needs to be considered if taken by patients with rheumatic conditions. While promising as adjunctive therapy, omega-3 fatty acids also come from food. So future trials examining total intake from food and supplement, to establish a holistic safe dose that can be used in conjunction with diet, is needed. Further studies are also needed to clearly establish the role of omega-3 fatty acids as a treatment option alone versus with other medications and among different ages.

Vitamin D deficiency has been associated with developing rheumatic conditions, but it remains to be clarified if vitamin D has a protective role.^{44, 45} Furthermore, it is still unclear if vitamin D is beneficial in established autoimmune disease, as data regarding disease activity with supplementation are conflicting, despite widespread knowledge that vitamin D is important to immune health, not just bones.⁴⁴⁻⁴⁶ Still, screening for deficiency and supplementing to reach normal levels, is strongly recommended. Achieving normal vitamin D levels in Canada can be challenging; vitamin D status is affected by variable sun exposure year round and diet, especially if dairy or enriched cow's milk alternatives are eliminated.

Probiotics and their use in modifying the gut microbiome in rheumatic conditions are promising. However, at this time, clinical trials have not shown a consistent or significant benefit on patient-reported symptoms or biochemical indices of disease burden.²⁵ More studies addressing strain, dose, as well as considering diet and prebiotic sources, are warranted before probiotics can be recommended.

Conclusions

It is an exciting time in the field of nutrition and health. Many reviews have demonstrated that food and nutrients can impact autoimmune disease.^{1-4, 47-48} A group was recently inspired to create a diet for RA based on interventional studies, as well as information from animal models and other diseases.⁴⁹ However more work is needed to delineate the role of diet in all rheumatic conditions, not just RA or SLE, and across the ages, given that pediatric needs are different than adults. Moreover, reviews highlight different goals and contradictory results, which make it difficult to guide patients. Canadians, as well as patients with RA and OA, eat poorly.⁵⁰⁻⁵² As such a first-line intervention for helping patients with rheumatic conditions can be to help improve intake and encourage a diet rich in whole foods, vegetables, fruits, whole grains, more plant-based proteins, but limited in processed foods, sugars, meats, salt and coffee. This summarizes the essence of eating well and can likely improve body composition, but may also improve disease management. Diets to treat rheumatic conditions have also been studied, but the only diet to date with any evidence of benefit is the Mediterranean diet; a diet that emphasizes healthy eating principles and diverges from usual western

eating habits. Rizzello et al. (2019) showcase the differences between the Mediterranean and western diet with illustrative figures that might be helpful in practice.¹⁵ Omega-3 fatty acids and vitamin D can be consumed from foods, but supplementation with close monitoring of doses may be added as adjunctive therapy. As part of assessing nutritional intake and status, considerations not reviewed in this commentary, such as disability affecting food preparation and eating, diet sustainability, as well as food security and accessibility also need to be studied and addressed. As we learn more and appreciate the role of diet in managing rheumatic conditions, imagine a future where even personalized nutrition and enhanced treatment may be fulfilled.⁵³

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