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THE INFLUENCE OF DIET ON THE COURSE OF PSORIASIS WITH PARTICULAR EMPHASIS ON THE MEDITERRANEAN DIET: A LITERATURE REVIEW

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ABSTRACT

Psoriasis is a chronic, immune-mediated inflammatory disease increasingly recognised as a systemic disorder linked to obesity, metabolic syndrome, and cardiovascular comorbidity. Because these comorbidities share an inflammatory and metabolic substrate that is sensitive to nutritional status, diet has attracted growing interest as a modifiable factor capable of shaping the clinical course of the disease. The objective of this review was to synthesise the current evidence on the relationship between dietary patterns, individual nutrients, and the severity of psoriasis, with particular attention to the Mediterranean diet as an integrated anti-inflammatory model. A review of the medical literature was conducted by searching the main biomedical databases and screening reference lists. The evidence indicates that overweight and obesity are consistently associated with greater disease severity and a poorer response to systemic and biologic therapies, whereas a low-calorie diet and weight loss reduce disease activity. Long-chain omega-3 fatty acids, dietary antioxidants, and polyphenol-rich foods have clear anti-inflammatory effects, while a gluten-free diet appears beneficial in patients with serological markers of gluten sensitivity. Higher adherence to the Mediterranean diet is repeatedly reported to be inversely associated with disease severity and with markers of systemic inflammation. Collectively, the evidence supports dietary modification, and a Mediterranean pattern in particular, as a rational and low-risk adjunct to standard pharmacological management, although the predominance of observational data underscores the need for adequately powered, prospective interventional trials.

KEYWORDS

Psoriasis; Mediterranean Diet; Nutrition; Inflammation; Dietary Intervention; Obesity

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Introduction

Psoriasis is a chronic, recurring, immune-mediated inflammatory disease that affects a substantial proportion of the general population across all geographic regions and ethnic groups. [1, 2] Although psoriasis is most clearly recognized by its typical cutaneous plaques, it is now understood not just as a skin disease, but as a systemic inflammatory condition. The current model of pathogenesis centres on dysregulation of the interleukin-23 and interleukin-17 axis and the activation of T-helper-17 lymphocytes, with tumour necrosis factor alpha and a range of additional pro-inflammatory mediators sustaining a self-amplifying inflammatory loop within the skin and in the systemic circulation. [2, 3] This systemic inflammatory character underpins the well-documented association between psoriasis and a group of comorbidities, including obesity, insulin resistance, dyslipidaemia, arterial hypertension, metabolic syndrome, non-alcoholic fatty liver disease, psoriatic arthritis, and an elevated risk of cardiovascular events. [1, 4, 5] The relationship between psoriasis and obesity is of particular interest because it appears to be bidirectional: adipose tissue functions as an active endocrine organ that secretes adipokines and pro-inflammatory cytokines capable of aggravating the psoriatic phenotype, while the chronic inflammatory state associated with psoriasis may in turn promote metabolic dysfunction. [4, 6] This two-way interaction provides a biologically coherent rationale for the hypothesis that nutritional status and dietary composition may influence the clinical course of the disease. Against this background, patients frequently enquire whether dietary modification can improve their condition, and clinicians are increasingly expected to provide evidence-based recommendations. A variety of dietary strategies have been proposed, ranging from caloric restriction and weight-reduction programmes to the elimination of specific components such as gluten, and to the supplementation of nutrients with putative anti-inflammatory properties. [7, 8, 9, 10] Among the integrated dietary patterns, the Mediterranean diet has emerged as an especially attractive candidate because its constituent foods deliver a favourable balance of monounsaturated fatty acids, long-chain omega-3 polyunsaturated fatty acids, dietary fibre, antioxidants, and

polyphenols, and because the pattern as a whole is already established as protective against the very cardiometabolic comorbidities that accompany psoriasis. [11, 12, 13] The research problem addressed by this review is the extent to which diet, and specifically the Mediterranean pattern, modulates the severity and course of psoriasis, and whether the available evidence is sufficient to inform clinical recommendations. The objective is therefore to identify, review, and evaluate the current literature on the relationship between diet and psoriasis, to explain the likely biological mechanisms involved, and to outline the clinical implications and the key gaps that future research should address.

Methodology

Study design

This work was designed as a narrative literature review intended to provide a broad, integrative synthesis of the existing evidence concerning the relationship between diet and the course of psoriasis. A narrative approach was chosen in preference to a formal systematic review because the underlying literature is methodologically heterogeneous, encompassing experimental studies, observational designs, clinical trials, and prior reviews, and because the aim was to integrate mechanistic and clinical perspectives into a coherent interpretative account rather than to derive a pooled quantitative estimate of effect.

Data sources and search strategy

Relevant publications were identified through structured searching of the principal biomedical bibliographic databases, complemented by manual screening of the reference lists of the retrieved articles in order to capture pertinent studies not returned by the electronic searches. The search combined controlled vocabulary and free-text terms relating to the disease with terms relating to nutrition and dietary patterns. Representative search concepts included psoriasis in combination with diet, nutrition, Mediterranean diet, obesity, weight loss, omega-3 polyunsaturated fatty acids, gluten, antioxidants, and inflammation. The search was restricted to publications available in the English language.

Eligibility criteria

Publications were considered eligible for inclusion if they examined the relationship between one or more dietary factors and the onset, severity, or clinical course of psoriasis, or if they elucidated the biological mechanisms linking nutrition to the inflammatory processes underlying the disease. Both human and relevant experimental studies were considered, as were narrative and systematic reviews and consensus recommendations issued by recognised professional bodies. Publications were excluded where diet was addressed only incidentally, where the disease under study was unrelated, or where the full text could not be retrieved.

Data extraction and synthesis

For each included publication, information was extracted concerning the dietary factor examined, the study population and design, the reported direction of any association with the course of psoriasis, and the proposed mechanistic basis. Because the intention of the present review, in accordance with its scope, was to provide a qualitative and interpretative synthesis, the findings are presented in narrative form and organised thematically rather than as a numerical or statistical meta-analysis. The evidence was appraised with attention to study design, the potential for confounding, and the consistency of findings across independent sources, and it was subsequently grouped into thematic categories corresponding to the principal dietary factors identified.

Results

The literature retrieved could be organised into several recurring thematic domains: the influence of body weight and caloric intake; the role of dietary fatty acids, and of long-chain omega-3 polyunsaturated fatty acids in particular; the effect of gluten and gluten-free diets; the contribution of dietary antioxidants, vitamins, and polyphenols; the impact of alcohol; and, as the central focus of this review, the effect of adherence to the Mediterranean dietary pattern. These domains are presented in turn below.

Body weight, caloric intake, and weight reduction

A consistent theme across the reviewed literature is the close relationship between excess body weight and the severity of psoriasis. Overweight and obese patients tend to present with more extensive and more treatment-resistant disease, and increasing adiposity is associated both with a heightened risk of developing psoriasis and with a poorer response to systemic and biological therapies, an effect attributable in part to altered pharmacokinetics in the context of increased body mass and in part to the pro-inflammatory milieu generated by expanded adipose tissue. [4, 14, 15, 16] Correspondingly, interventional studies of hypocaloric diets and structured weight-reduction programmes report improvement in disease severity following meaningful weight loss, and the combination of caloric restriction with pharmacological treatment appears to enhance therapeutic

response relative to pharmacotherapy alone. [7, 10, 16, 17, 18] These observations position weight management as one of the most strongly supported dietary interventions in psoriasis.

Dietary fatty acids and omega-3 polyunsaturated fatty acids

The composition of dietary fat has attracted particular attention because of the central role of lipid-derived mediators in inflammation. Long-chain omega-3 polyunsaturated fatty acids, abundant in oily fish, compete with arachidonic acid as substrates in the eicosanoid biosynthetic pathways, thereby shifting the balance towards the production of less inflammatory mediators and towards specialised pro-resolving lipid mediators that actively promote the resolution of inflammation. [19, 20] Conversely, a diet rich in saturated fat and in omega-6 fatty acids favours the generation of more pro-inflammatory eicosanoids. [20] Studies examining omega-3 supplementation and higher dietary fish intake generally report a favourable, if modest, influence on disease activity, providing a mechanistic and clinical rationale for the prominence of fish and vegetable oils within anti-inflammatory dietary patterns. [20, 21]

Gluten and the gluten-free diet

An epidemiological and immunological association between psoriasis and coeliac disease has been described, and a proportion of patients with psoriasis demonstrate serological markers of gluten sensitivity in the absence of overt coeliac disease. [22, 23] In this specific subgroup, adherence to a gluten-free diet has been reported to improve cutaneous disease, whereas in patients without such serological evidence the benefit of gluten avoidance is not established. [7, 9, 22] The reviewed literature therefore supports a targeted rather than a universal recommendation, in which gluten restriction is reserved for patients with demonstrable markers of gluten sensitivity and is not advocated indiscriminately for the wider psoriatic population. [7]

Antioxidants, vitamins, and polyphenols

Oxidative stress is recognised as a contributory element in the inflammatory pathophysiology of psoriasis, and dietary antioxidants have accordingly been examined for a protective role. Fruits, vegetables, and other plant-derived foods rich in carotenoids, vitamin C, vitamin E, and polyphenolic compounds may counteract oxidative damage and modulate inflammatory signalling. [8, 21] Vitamin D, whose immunomodulatory activity is well characterised and which underlies the therapeutic use of topical vitamin D analogues, has likewise been of interest, with lower vitamin D status observed in some patients. [7, 21] Although the individual contribution of any single micronutrient is difficult to isolate, the aggregate evidence favours a diet abundant in plant foods, and it is notable that such foods constitute a defining feature of the Mediterranean pattern. [8]

Alcohol

Alcohol consumption has been associated with an increased risk and greater severity of psoriasis, as well as with reduced treatment adherence and reduced response to therapy. [6, 24] Alcohol may aggravate the disease through pro-inflammatory and immunomodulatory effects, through impairment of hepatic function relevant to certain systemic treatments, and through its association with other adverse lifestyle factors. [24] The moderation of alcohol intake therefore represents a further dietary consideration relevant to disease management, and it is consonant with the moderate consumption patterns characteristic of the traditional Mediterranean lifestyle. [6]

The Mediterranean diet

The Mediterranean diet integrates the individually beneficial elements described above into a single coherent dietary pattern. It is characterised by a high consumption of extra-virgin olive oil as the principal source of fat, by an abundance of vegetables, fruit, legumes, nuts, and whole grains, by regular intake of fish, by moderate consumption of dairy products and poultry, by a limited intake of red and processed meat and of refined sugars, and, in its traditional form, by moderate consumption of wine taken with meals. [12, 13] Extra-virgin olive oil contributes monounsaturated fatty acids together with polyphenolic compounds possessing recognised anti-inflammatory properties, while the pattern as a whole delivers a favourable fatty-acid profile, a high antioxidant and fibre content, and a low glycaemic load. [8, 13] The literature examining the Mediterranean diet in relation to psoriasis consistently reports an inverse association between adherence to this pattern and disease severity, such that patients with higher adherence tend to exhibit less severe disease than those with lower adherence. [25, 26, 27, 28] This relationship has been observed in observational cohorts employing validated indices of Mediterranean-diet adherence, and it persists after accounting for recognised confounding factors, suggesting an association that is not merely a by-product of general health consciousness. [25, 27] The pattern has additionally been linked to reductions in circulating markers of systemic inflammation, a finding that supplies a likely biological bridge between the diet and the amelioration of an inflammatory dermatosis. [25, 26] Because the Mediterranean diet also confers well-established protection against the cardiometabolic comorbidities that frequently accompany psoriasis, its potential benefit extends beyond the skin to the wider systemic burden of the disease. [11, 12, 13]

Discussion

Taken together, the evidence reviewed here here shows that diet is a real, supportive factor in how psoriasis progresses. The most consistent and clinically useful findings relate to body weight: the link between obesity and disease severity is strong, well-supported by biology, and backed by clinical trials showing that weight loss improves the disease and boosts the effectiveness of medical treatment. [7, 10, 14, 16, 17] The remaining dietary factors, including omega-3 fatty acids, antioxidants, and the avoidance of gluten in sensitised individuals, contribute additional, more modest, and in some cases more selective benefits. [21, 29] The Mediterranean diet is highly important precisely because it combines these various benefits into a single enjoyable and balanced lifestyle, rather than presenting them as a set of separate dietary rules. [9, 25] The mechanistic interpretation of these observations rests on the systemic and inflammatory nature of psoriasis. A dietary pattern that reduces adiposity, supplies pro-resolving lipid precursors, delivers abundant antioxidants and polyphenols, and lowers glycaemic load would be expected to attenuate the low-grade systemic inflammation that both accompanies and aggravates the disease. [13, 19, 20] The reported reductions in inflammatory markers associated with Mediterranean-diet adherence lend empirical support to this interpretation and align the dermatological findings with the extensive cardiometabolic literature on the same dietary pattern. [11, 12] However, there are several limitations that undermine the reliability of the conclusions that can be drawn from the current data. Much of the evidence linking diet to the severity of psoriasis comes from observational studies. These studies do not rule out reverse causality-which means that patients with a milder form of the disease may simply find it easier to maintain a healthy diet. They also cannot fully account for certain lifestyle factors that may skew the results. [9, 29] The literature is further characterised by heterogeneity in the definition and measurement of dietary exposure, in the instruments used to assess disease severity, and in the populations studied, all of which complicate direct comparison across studies. In addition, the interventional evidence, where it exists, is most developed for weight reduction and is relatively rare for the Mediterranean pattern considered as a discrete intervention. Despite these limitations, the clinical implications are meaningful. Dietary counselling directed towards weight normalisation and towards adoption of a Mediterranean pattern is low in risk, is likely to yield benefits for the cardiometabolic comorbidities of psoriasis irrespective of its cutaneous effect, and is consistent with recommendations issued by recognised dermatological bodies. [7] Such counselling is best framed as a complement to, and not a substitute for, evidence-based pharmacological therapy, and it should be individualised, with gluten restriction in particular reserved for patients exhibiting serological markers of gluten sensitivity. [7, 22]

Conclusions

The available literature supports the conclusion that diet exerts a measurable influence on the course of psoriasis and that this influence is mediated principally through effects on body weight and on systemic inflammation. Excess adiposity aggravates the disease and impairs treatment response, whereas weight reduction improves it; long-chain omega-3 fatty acids, dietary antioxidants, and, in selected patients, the avoidance of gluten confer additional benefit. [7, 8, 9] The Mediterranean diet, by integrating these beneficial features into a single sustainable pattern, is repeatedly associated with reduced disease severity and with attenuation of systemic inflammation, and it simultaneously addresses the cardiometabolic comorbidities that characterise the disease. [11, 25] Dietary modification, and adherence to a Mediterranean pattern in particular, therefore represents a rational adjunct to standard therapy. At the same time, the mainly observational character of the evidence and the methodological heterogeneity of the available studies preclude firm causal conclusions. Future research should focus on well-designed randomized trials with adequate statistical power. These studies should evaluate the Mediterranean diet using standardized measures-both in terms of dietary adherence and the severity of psoriasis symptoms. It is also crucial to include objective inflammatory and metabolic biomarkers and assess the long-term impact of the diet on comorbidities. Such a step will allow for an unambiguous determination of the strength and durability of the dietary effect. As a result, this will create a solid foundation for incorporating nutritional therapy into standard patient care protocols.

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