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Review Article

Optimizing pediatric psoriasis management through anti-inflammatory dietary interventions

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ABSTRACT

Recent studies have increasingly focused on investigating the impact of anti-inflammatory dietary patterns, particularly emphasizing the Mediterranean diet, on the severity and progression of pediatric psoriasis. This review comprehensively examines a wide range of studies that explore the correlation between dietary intake patterns and clinical outcomes in children with psoriasis, providing a detailed synthesis of current evidence. It critically evaluates the role of specific anti-inflammatory nutrients such as polyphenols, omega-3 fatty acids, and vitamins A, D, and E, emphasizing their mechanisms in reducing inflammatory markers and modulating immune responses specific to pediatric psoriasis. Additionally, the review provides an in-depth assessment of the safety, feasibility, and long-term adherence to these dietary patterns, considering factors like dietary compliance, nutritional adequacy, and potential adverse effects. By offering a nuanced analysis, this review aims to substantiate the potential efficacy of anti-inflammatory diets as adjunctive therapies for pediatric psoriasis management, identifying existing research gaps and suggesting avenues for future investigations to optimize dietary interventions in clinical settings.

Keywords: Pediatric psoriasis, Anti-inflammatory diets, Mediterranean diet, Polyphenols, Omega-3 fatty acids, Immune modulation

INTRODUCTION

Psoriasis is a common, chronic inflammatory skin condition characterized by thick, scaled plaques with varying severity and distribution. While the exact pathogenesis remains unknown, it has been found to involve the interplay between inherited and environmental factors. Key players in the manifestation of psoriasis include inflammatory mediators such as tumor necrosis factor tumor necrosis factor alpha (TNF-α), interferon gamma (IFN-γ), interleukin IL-17, IL-22, IL-23, and IL-1β.[1,2] While genetics may predispose patients to psoriasis, lifestyle factors such as diet, stress, and infection can contribute to the elevated levels of inflammatory markers exhibited in the disease.

Affecting 2-3% of the population and most often associated with adults, psoriasis has been gaining recognition in pediatric patients as it makes up almost a third of all cases.[3] Psoriasis was previously thought to follow a bimodal pattern with distinct early and late-onset categories. However, a focused incidence study

disapproved of this hypothesis and found more specifically that psoriasis prevalence in children increased rapidly until age seven, after which it continued to rise, though at a slower rate.[4] Pediatric psoriasis presents unique challenges, including diagnosis difficulty, as it often mimics other common childhood conditions such as eczema, decreased quality of life, age-restricted treatment options, and patient compliance. Recent research has underscored the importance of exploring innovative management strategies to improve outcomes for young patients, leading to a growing interest in the role of dietary interventions as a potential adjunctive therapy.

Amongst the various modalities being investigated, anti-inflammatory dietary patterns have emerged as a promising holistic approach to managing pediatric psoriasis. The Mediterranean diet (MD) has attracted attention due to its anti-inflammatory properties. The diet is high in vegetables, nuts, legumes, and other sources of monounsaturated fatty acids while low in alcohol, dairy products, and red meats. The rich content of polyphenols, omega-3 fatty acids, and vitamins A, D, and E significantly decrease oxidative stress, reactive species, and inflammatory markers.[5-7] By managing immunomodulatory inflammation seen in chronic cases, diet could benefit psoriasis treatment plans, especially in children who may not be candidates for more intense modalities.

This comprehensive review aims to analyze and synthesize the existing research on how anti-inflammatory dietary patterns impact clinical outcomes in pediatric psoriasis, focusing on both the efficacy and feasibility of integrating such diets into clinical practice. By examining the correlation between dietary intake and psoriasis severity, this review highlights the potential benefits of specific anti-inflammatory nutrients and addresses important considerations regarding dietary compliance, safety, and long-term adherence. The goal is to thoroughly evaluate how dietary strategies can complement traditional treatments and improve patient outcomes. Furthermore, by identifying gaps in current research, this review aims to pave the way for future studies that could refine dietary recommendations and enhance the management of pediatric psoriasis, ultimately supporting more holistic and effective treatment plans.

MECHANISMS OF ACTION: ANTI-INFLAMMATORY NUTRIENTS

In managing pediatric psoriasis, diet plays an increasingly recognized role in mitigating the inflammatory processes central to this chronic condition. Psoriasis, driven by immune system dysregulation and characterized by the hyperproliferation of keratinocytes, has been shown to respond to dietary interventions that target inflammation. Nutrients such as polyphenols, omega-3 fatty acids, and vitamins A, D, and E have emerged as key players in modulating immune responses, reducing oxidative stress, and supporting skin health. Clinicians can offer a complementary approach to traditional pharmacological treatments by incorporating anti-inflammatory nutrients into pediatric diets. However, dietary adherence and accessibility present unique challenges, especially in younger children. Therefore, understanding the role of these nutrients, the most effective dietary patterns, and how to optimize them for pediatric patients is critical to improving both clinical outcomes and quality of life for children with psoriasis. This paper explores the mechanisms of action of key anti-inflammatory nutrients and their potential benefits in pediatric psoriasis management while also addressing practical considerations such as adherence and nutritional accessibility.

Polyphenols

Although individual diets differ, many commonly consumed foods are naturally rich in polyphenols.[8] Foods rich in these plant-derived bioactive compounds include nuts, berries, broccoli, and carrots. Polyphenols contribute to the color, flavor, and pharmacological properties of fruits and vegetables and are categorized into two main groups: flavonoids—including flavones, flavonols, isoflavones, neoflavonoids, chalcones, anthocyanidins, and proanthocyanidins—and non-flavonoids, which include phenolic acids, stilbenoids, and phenolic amides.[8] The unique chemical structure of polyphenols allows them to exert significant immunomodulatory effects, making their widespread presence in nature worthy of further investigation. Studies in rats have shown that certain polyphenols can inhibit cyclooxygenase (COX), deactivate peroxisome proliferator-activated receptor gamma, and induce endothelial nitric oxide synthase.[9] Additionally, polyphenols like curcumin have been found to reduce the expression of key inflammatory cytokines, including TNF-alpha and IL-1.[10] The cumulative anti-inflammatory effects of polyphenols suggest they could play a crucial role in holistic psoriasis management.

Psoriasis, a chronic inflammatory disease, consists of immune system dysregulation that eventually results in the hyperproliferation of keratinocytes. Though keratinocytes are heavily involved, endothelial cells, monocytes, and Langerhans cells play a vital role in disease development and present as a potential target for treatment modulation.[11] Studies have shown that resveratrol and curcumin yield specific therapeutic benefits on patients with psoriasis as well as catechins. Resveratrol, a polyphenol present in grapes and red wine, has shown positive results in patients with psoriasis, especially in a topical form.[12] In fact, a double-blind study indicated that an overwhelming majority of patients treated with a resveratrol-containing ointment experienced statistically significant improvement in their psoriasis lesions when compared to a control group.[12] The results of this study indicate the positive role of this anti-inflammatory compound in psoriasis patients with not only clinical surface-area based improvement, but also mental health-based improvement. Catechins, found in green tea, have

shown positive results through their ability to scavenge free radicals and thereby reduce the UV radiation induced oxidative damage.[13] Furthermore, curcumin's ability to inhibit the NLRP3 inflammatory body and the subsequent suppression of IL-22 and IL-18 enhances the evidence of its warranted use in psoriasis patients.[14] Research surrounding the use of polyphenols in psoriasis patients is vast, but the overarching theme centers on the positive anti-inflammatory benefit in patients suffering from this challenging chronic disease.

Given the anti-inflammatory benefits of polyphenols in managing psoriasis, assessing their presence in pediatric diets is crucial to maximize therapeutic outcomes. A cross-sectional analysis of children's polyphenol intake revealed that males generally consume more polyphenols than females, with the primary sources being non-alcoholic beverages and fruits.[15] The Mediterranean diet, which is rich in polyphenols, could serve as a baseline nutritional plan for pediatric psoriasis patients. Foods high in polyphenols include apples, berries, broccoli, cumin, cocoa, flax seeds, and ginger. Although these foods are naturally abundant, achieving the desired therapeutic effects depends on adherence, which tends to be low in preschool-aged children but increases significantly during adolescence.[16] Therefore, promoting adherence to a polyphenol-rich diet from an early age could be a key strategy in optimizing the management of pediatric psoriasis.

Omega-3 fatty acids

Omega-3 fatty acids are derived from a range of sources, with fish and certain plants being the most prominent. These beneficial fats are widely available in both supplement form and through direct consumption of omega-3-rich foods. Specifically, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) from oily fish, and alpha-linolenic acid (ALA) from plants, have been shown to support both cardiovascular and immune health.[17] In the context of skin health, omega-3 fatty acids play a crucial role in preventing excessive immune responses. Leukotrienes, which are primarily synthesized via the 15-lipoxygenase pathway, lead to the production of 15-hydroxyeicosatetraenoic acid. Additionally, the epidermis can convert leukotriene A4, produced by polymorphonuclear leukocytes, into leukotriene B4, a key inflammatory mediator.[18] Important to our discussion of the impact on psoriasis is the ability of omega-3 fatty acids to interfere in this inflammatory process. The consumption of EPA and DHA results in the formation of hydroxylated metabolites via 15-lipoxygenase, specifically 15-hydroxyeicosapentaenoic acid and 15-hydroxydocosahexaenoic acid. These metabolites are powerful inhibitors of 5-lipoxygenase in mononuclear cells and thereby reduce the synthesis of the proinflammatory leukotrienes LTB4, LTC4, and LTD4.[18] The anti-inflammatory effects of omega-3 fatty acids, through their modulation of leukotriene production, highlight their potential therapeutic value in managing psoriasis and preventing excessive immune responses in the skin.

Emerging evidence highlights the therapeutic potential of omega-3 fatty acids in treating inflammatory skin conditions, sparking further research into their role in managing psoriasis. The promising immunologic results observed in animal models, along with their capacity to alter cell membranes, have led to additional studies on the direct effects of omega-3 fatty acids in psoriatic treatment.[19] One such study examined the impact of a daily oral EPA and DHA 640 mg pill on patients with previous topically managed psoriasis patients. The combination of this supplement with tacalcitol produced statistically significant improvements in patient outcomes.[18] This suggests that integrating dietary supplements with topical therapies can enhance treatment efficacy. A meta-analysis of ten studies by Clark et al revealed that ω-3 polyunsaturated fatty acid supplementation was associated with significant reductions in psoriasis area and severity index (PASI) scores, as well as decreases in overall erythema and scaling.[20] It is important to also note that levels of polyunsaturated fatty acids have been correlated with psoriasis severity. Males have been shown to suffer worsening psoriasis with lower overall plasma docosahexaenoic acid and arachidonic acid when compared to females.[21] These findings emphasize the need for personalized treatment strategies that account for individual fatty acid profiles and potentially include oral omega-3 fatty acid supplementation.

Management of pediatric psoriasis requires a careful balance of medical and dietary care. The diet may provide a significant source of omega-3 fatty acids that will help patients manage their psoriatic symptoms, without the use of an oral supplement. To effectively support the body's immunomodulatory processes, patients over one-year-old typically need about 700-1000 mg per day of combined DHA and EPA.[22] Reaching this target often involves meticulous dietary planning. Food high in omega-3 primarily includes oily fish and flaxseed. In a pediatric diet, enriched dairy products and poultry meat may also serve as sources of EPA and DHA.[23] Thus, the incorporation of these foods into a balanced diet can be an essential adjunctive component of pediatric psoriasis management.

Vitamins A, D and E

Vitamins play a crucial role in maintaining overall health, and while many essential nutrients are typically obtained through our diets, individuals with autoimmune conditions like psoriasis must ensure they receive the appropriate daily amounts. Vitamins A, D, and E are particularly important antioxidants for skin health. Vitamin A, in its retinol form, is a powerful agent for skin cell regeneration and is essential for maintaining skin integrity. Vitamin E, a lipid-soluble antioxidant, helps neutralize free radicals and supports cell repair.[24] Vitamin D is vital for both the innate and adaptive immune systems and is extensively

studied in autoimmune diseases due to its common deficiency in this patient population.[25] Ensuring adequate intake of these vitamins is key to supporting both skin health and overall immune function in individuals with psoriasis, most importantly our pediatric psoriasis patients.

Vitamin A is essential for maintaining skin health and integrity, especially due to its influence on the skin's innate immune system. It enhances the skin's immunity by increasing the expression of toll-like receptors 2 and 3, boosting antimicrobial protein production, and regulating mast cell activity.[26] The all-trans-retinoic acid form of vitamin A further supports skin health by downregulating toll-like receptor 2, which prevents the release of monocyte cytokines.[27] Thanks to its immunomodulatory properties, vitamin A is utilized in both topical and oral treatments for psoriasis. Patients with psoriasis often exhibit vitamin A deficiency, and they typically benefit from vitamin A-based therapies, which reduce skin cell hyperproliferation through the effects of retinoic acid and retinal.[28] Vitamin A plays a vital role in managing and improving skin conditions like psoriasis.

Vitamin D is an essential vitamin for both healthy and psoriatic patients. Vitamin D has two forms: vitamin D2 (ergocalciferol) and vitamin D4 (cholecalciferol). The primary supply of vitamin D for the body is through the skin rather than from diet. The human epidermis and serum produce a photoproduct of pre-vitamin D, which is hydroxylated by CYP11A1 and CYP27A1 enzymes to form 20S-hydroxytachysterol3 [20S(OH)T3] and 25(OH)T3. These metabolites, like 1,25-dihydroxyvitamin D, can inhibit the proliferation of epidermal keratinocytes and dermal fibroblasts, promoting the activation of keratinocyte differentiation and antioxidant genes.[25] Calcitriol also interferes with antigen presenting cell (APC) differentiation through the promotion of tolerance and decreased expression of MHC class II on the cell surface.[29] Vitamin D has a wide-ranging impact on the body, particularly on the adaptive immune system, which paves the way for further research into its effects on pediatric psoriasis patients. Vitamin D reduces T helper cell differentiation and proliferation and further hinders the inflammatory response through the inhibition of Th1 pro-inflammatory cytokines and stimulation of anti-inflammatory Th2 cytokines.[30] As previously mentioned, psoriasis severity has been strongly correlated with vitamin D levels. In fact, a case-control study by Mohta and Nyati found that patients with psoriasis had a significantly lower vitamin D level than healthy controls (t score 6.557; p value <0.0001) and a highly significant negative correlation between PASI score and serum vitamin D level.[31] Considering the correlation between vitamin D and psoriasis, evaluating serum vitamin D levels in pediatric patients with psoriasis could be a valuable step toward improving symptom management.

Vitamin E, like vitamins A and D, is a vital fat-soluble vitamin that plays a key role as an antioxidant with eight distinct isoforms. It localizes to the mitochondrial membrane, where it functions as a peroxyl radical scavenger, crucial for protecting cells from oxidative damage.[32] Vitamin E exists in various forms, including tocopherols, tocotrienols, and tocomonoenols, which are naturally found in foods such as almonds, hazelnuts, walnuts, palm oil, and soybean.[33] Unlike vitamins A and D, there is limited evidence of vitamin E deficiency in psoriatic patients. However, research suggests that vitamin E may have beneficial effects at the cellular level in individuals with psoriasis.[28] Vitamin E's antioxidant properties introduce a third vitamin that has shown promising results in the pathogenesis of psoriasis. Although not fully understood, vitamin E opens new avenues for research into its potential therapeutic role and mechanisms in managing the disease.

EVALUATION OF ANTI-INFLAMMATORY DIETARY PATTERNS

A tailored diet, accounting for the pro-inflammatory physiology of psoriasis, can be helpful in controlling psoriasis when combined with pharmacological therapy. Foods within the Mediterranean diet are high in hydroxycinnamic acid derivatives, which block the production of reactive oxygen species (ROS). A study from NutriNet-Santé Cohort in 2018 showed that, in adult patients, there was an inverse association between following the Mediterranean diet and having more severe psoriasis.[34] There are a limited number of studies available focusing on pediatric patient's outcomes when following the Mediterranean diet; however, the American Academy of Pediatrics recommends screenings for common comorbid conditions that are influenced by poor diet. Screenings include childhood obesity, type 2 diabetes mellitus, hypertension, and dyslipidemia.[35] Comorbid inflammatory conditions commonly seen with psoriasis will often have dietary and lifestyle changes as first line treatment.

Adult patient trials have found that the Mediterranean diet, gluten-free diet, low calorie diet, and ketogenic diet all have a positive effect on psoriasis presentation severity due to their anti-inflammatory nature. It is hypothesized that children following these diets could experience similar benefits as seen in adult studies. Hypothetically, following the Mediterranean diet would increase the omega-3:6 ratios, which in turn would help inhibit cyclooxygenase-2, ultimately leading to decreased inflammatory cytokines. The low-calorie diet is postulated to decrease inflammatory cytokines by decreasing leptin and increasing adiponectin; however, both diets decrease inflammation leading to a decrease of psoriasis. The gluten free diet could be considered for children with celiac disease, in this hypothesis eliminating gluten from the diet would inactivate Th17 cells activated from gliadin, decreasing IL-17 and IL-22 to decrease psoriasis.[16] The ketogenic diet was also studied in addition to the Mediterranean diet as a combined diet. The two diets combined showed weight loss in adults who followed this diet and a decrease in overall pro-inflammatory

cytokines.[36] Although it is unclear if following a ketogenic diet for weight loss would be beneficial for children with psoriasis who are not overweight or obese. Though the currently available research is limited, it is imperative to consider comorbid conditions in children with psoriasis as certain dietary alterations may benefit each patient uniquely based on their needs.

Ensuring a healthy and well-rounded diet is important for any child, and good dietary nutrition should not be overlooked for diet options. The Mediterranean diet is considered a safe and well tolerated diet for children with positive effects apart from psoriasis. Interestingly it is shown that physical activity and screen time can be predictive factors of adherence to the Mediterranean diet for children.[37] This could be due in part to parenting styles. A barrier to following diets includes the ability of the parents to afford foods within the diet. There is a positive correlation between education levels of the parents, socioeconomic status, health awareness of the parents, and better quality of a diet.[37] Families with lower education and socioeconomic status might not have the financial abilities to buy high quality and healthy groceries. One solution to this barrier is to encourage schools to start incorporating healthy food choices that follow anti-inflammatory diets into the school lunches. Frequent follow ups with a pediatrician to continue discourse of nutrition is also important. Following the Mediterranean diet does carry some potential for nutritional deficiencies. Not eating enough red meat could lead to decreases in iron, and families should be educated on fortified foods. Reduction of dairy products also puts children at risk for low calcium levels, and families should be educated on supplementation. However, overall, it is found that following the Mediterranean diet has low levels of inadequate micronutrient intake.[38] While the Mediterranean diet presents some potential nutritional challenges, educating parents on proper supplementation and the diet's overall benefits makes it a valuable option for managing psoriasis in children, particularly when paired with efforts to improve dietary access and awareness.

CLINICAL IMPLICATIONS AND APPLICATIONS

In recent years, numerous studies have examined the relationship between diet and the symptoms and severity of psoriasis. These studies consistently found that overweight or obese patients experienced more severe symptoms compared to those of normal weight. While the exact mechanism linking obesity and psoriasis remains unclear, chronic inflammation and inflammatory cytokines such as TNF-a, IL-1, and IL-6 are thought to play a key role.[39] Given the common inflammatory pathways shared by psoriasis and obesity, along with strong evidence from adult studies, experts have advocated for further research into the potential benefits of anti-inflammatory and weight-reduction diets in managing pediatric psoriasis.

Anti-inflammatory diets, such as Mediterranean and gluten-free diets, have been proposed as potential strategies to enhance the treatment of pediatric psoriasis. As previously mentioned, the Mediterranean diet is known for its anti-inflammatory properties and its ability to reduce reactive oxygen species, which are crucial in the development and severity of psoriasis. De-Simoni et al found that adherence to the Mediterranean diet not only reduced the severity of the disease but also complemented pharmacological treatments, creating a synergistic effect.[16] Additionally, the Mediterranean diet is often associated with weight reduction, which further decreases pro-inflammatory cytokines linked to obesity.

Alongside the Mediterranean diet, the gluten-free has also been considered as a supplementary approach to traditional therapy. Research indicates that patients with psoriasis have a 2.2-fold increased risk of developing celiac disease and a 2.4-fold higher risk of elevated anti-gliadin antibody levels compared to controls.[40] This heightened risk has driven further investigation into the potential benefits of a gluten-free diet in managing psoriasis. Several studies have shown improvements in the psoriasis area and severity index score in patients with positive anti-gliadin antibody levels and confirmed celiac disease, while those with normal anti-gliadin antibody levels did not experience similar benefits.[41,42] Overall, while the Mediterranean diet has demonstrated significant benefits in reducing symptoms for this patient population, the gluten-free diet should be reserved for those with confirmed celiac disease to maximize therapeutic impact.

Although anti-inflammatory diets are generally considered safe for pediatric patients, their implementation in children with psoriasis has been limited due to the vulnerability of this population in research. Given the sensitivity of pediatric patients and the potential impact on growth, drastic dietary changes should be approached with caution. Gradually introducing elements of these diets, alongside vitamin supplementation and regular monitoring by the child's pediatrician, is recommended. This gradual approach not only helps minimize risks but also enhances adherence, especially in preschool and school-aged children, who often resist dietary changes and have lower adherence rates.[16] Therefore, it is crucial to provide targeted nutritional education to these children and their families during this period.

Various strategies have been employed to improve dietary compliance in the pediatric population, with parental buy-in proving to be the most effective. To secure parental buy-in, it is essential to highlight the benefits, such as reduced psoriasis symptoms and lowered risks of cardiovascular disease, diabetes mellitus, and autoimmune conditions.[37] In a study by Roset-Salla et al, educational workshops for parents of preschool-aged children significantly increased childhood adherence to dietary interventions compared to a control group.[43] These workshops focused on food groups, different diets and their potential benefits, types of physical activity, and how to gradually introduce dietary

changes. Building on this study's findings, incorporating similar educational initiatives for parents can enhance adherence to anti-inflammatory diets, thereby aiding in symptom reduction in pediatric psoriasis patients.

To determine if an anti-inflammatory or gluten-free diet can reduce symptoms, it's essential to evaluate patient adherence using tools like the KIDMED (Mediterranean diet quality index for children and adolescents) and the celiac dietary adherence test (CDAT). KIDMED, the most used tool, consists of a 16-item questionnaire that categorizes adherence into optimal, moderate, or low levels, providing a clear picture of dietary habits.[44] The CDAT, on the other hand, is specifically designed to evaluate adherence to a gluten-free diet in children, assessing how well patients maintain a strict gluten-free regimen.[45] Once adherence is determined, the PASI score can then be used to evaluate the degree of redness, thickness, scaling of lesions, and affected body surface area, offering a comprehensive measure of disease severity and the effectiveness of dietary management.

RESEARCH LIMITATIONS AND FUTURE DIRECTIONS

Long-term studies are crucial for evaluating the sustained impact of dietary interventions on pediatric psoriasis, particularly regarding adherence to new dietary regimens and the improvement in psoriasis symptoms. Such studies must account for the variability in dietary compliance among children, who may resist consuming specific foods or have a limited range of preferred foods that do not align with a prescribed diet, such as the Mediterranean diet. Additionally, the accessibility of fresh, healthy foods poses a significant challenge, especially in underserved communities where families might struggle to obtain the necessary fruits, vegetables, and lean meats. In 2018, there were 11.2 million children who lacked access and security to healthy foods.[46] Addressing these barriers is vital, as they can affect both the feasibility and effectiveness of dietary interventions. Future research should consider these factors to ensure that dietary recommendations are both practical and equitable for diverse pediatric populations.

One area for future exploration in optimizing pediatric psoriasis management is the potential for personalized nutrition. Recent advancements in nutrigenomics and nutrigenetics suggest that individualized dietary interventions could be developed based on a child's genetic, metabolic, and microbiome profiles.[47] Personalized nutrition could be utilized to enhance the effects of an anti-inflammatory diet by creating a diet that meets the needs for each patient. For example, a child with psoriasis might respond to certain foods differently than the next based on variations in genes related to inflammatory pathways and metabolic responses. Moreover, emerging research on the gut-skin axis highlights the intricate relationship between the gut microbiome and skin health, suggesting that dietary interventions that modulate the microbiome could play a pivotal role in managing psoriasis.[48] Studies have begun to uncover how gut bacteria can influence inflammatory markers that can affect skin conditions. Further investigation into genetic, metabolic, and microbiome data could pave the way for innovative, personalized dietary interventions that are effective ways in managing pediatric psoriasis.

Innovation in dietary interventions for pediatric psoriasis management is a promising area of research that can significantly enhance treatment outcomes. One key area of innovation is the use of digital health tools and mobile apps to support dietary adherence. These tools can provide personalized guidance, track food intake, and offer timely feedback, improving adherence to anti-inflammatory diets. With access to these health tools, physicians can monitor patient progress more effectively and adjust dietary plans, as long as patients are using the tools appropriately. Additionally, there is a growing interest in investigating the impact of novel anti-inflammatory foods and supplements. As discussed previously, foods which contain anti-inflammatory components such as omega-3 fatty acids or polyphenols have shown promising results in the reduction of inflammatory markers contributing to the severity of psoriasis. Future research should focus on evaluating these foods and supplements within the context of pediatric psoriasis, determining their efficacy, and integrating them into personalized dietary interventions. This holistic approach could lead to more effective and sustainable management strategies for pediatric psoriasis, ultimately improving patient outcomes and quality of life.

CONCLUSION

Anti-inflammatory dietary patterns, particularly the Mediterranean diet, show considerable potential as adjunctive therapies in the management of pediatric psoriasis. Rich in polyphenols, omega-3 fatty acids, and vitamins A, D, and E, these diets appear to modulate immune responses, decrease inflammatory markers, and alleviate oxidative stress—factors intricately linked to the pathophysiology of psoriasis. This comprehensive review highlights the capacity of these nutrients to mitigate disease severity, providing an alternative approach for pediatric patients who may not be ideal candidates for intensive pharmacological therapies. Despite the promising evidence, questions remain regarding long-term adherence, safety, and the practical application of these dietary interventions in pediatric populations. Nutritional adequacy and potential adverse effects must be carefully balanced with therapeutic benefits. Future research should refine dietary recommendations, explore patient-specific dietary interventions, and rigorously assess the sustained impact of anti-inflammatory diets on disease progression and quality of life in pediatric psoriasis. Integrating dietary interventions into pediatric psoriasis management may require the development of structured dietary counseling programs and interdisciplinary collaboration between dermatologists, nutritionists, and pediatricians to ensure

that patients receive personalized, evidence-based nutritional guidance alongside conventional treatment strategies.

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