

Dietary Management of Skin Diseases

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Published:

J Turk Acad Dermatol 2015; 9 (3): 1593r2.

This article is available from: <http://www.jtad.org/2015/3/jtad1593r2.pdf>

Keywords: Skin disease, nutrition, antioxidants, vitamins, minerals

Abstract

Background: Many nutrients are essential for life, and an adequate amount of nutrients in the diet is necessary for providing energy, building and maintaining body organs, and for various metabolic processes. Some of the vitamins and minerals, which we get through the nutrients, have an important role in various metabolic processes. The photo-protective potential of antioxidants, the effects of micronutrient supplementation on the skin immune system, and the modulating effects of fatty acids on skin disorders are well documented. In this review, the importance of diet and nutrition in some skin diseases has been revised principles.

Introduction

Skin functions normally as long as adequate nutrition is provided. Malnutrition, improper diet, popular diets, and unidirectional nutrition give clues about several systemic diseases that are about to develop in the body with signs on skin, hair and nails. The aim of this review is to draw attention to the importance of nutrition in some skin diseases (**Table 1**). Shows the importance of diet in skin disorders [1]. Dermatitis herpetiformis (DH) is a classic skin disease where diet/ nutrition plays an important role [2].

Pemphigus

The disease cause blisters in mouth or throat which are typically painful and do not heal for a long time making it hard to swallow and eat. Acidic, sour, and spicy foods should be avoided when in presence of pemphigus blisters. Also, foods and beverages should not be consumed when they are too hot or too cold.

Generally watery and soft foods, which may not irritate the blisters, should be preferred during this period. When the healing process lasts longer, the patient may suffer from fatigue, weight loss, anorexia, and nutritional deficiencies related to lesions in the mouth. These patients should be carefully monitored in terms of nutrition, and nutritional support should be provided, if necessary. Coexisting diseases, such as tuberculosis, osteoporosis, previous cerebral or gastrointestinal bleeding, may directly affect the course and treatment of pemphigus [3]. Patients should take care of their diet especially while receiving cortisone injection treatment, and avoid eating salty foods and carbohydrate (pastry, dessert, etc.).

Low serum zinc and copper levels and increased oxidative stress have been indicated to correlate with pemphigus vulgaris [4]. Substances including thiols, thiocyanate, phenols and tannins may accelerate pemphigus in genetically predisposed individuals [5]. Some vegetables, such as garlic, onion, mustard and

turnip, broccoli, radish, cabbage, cauliflower, potato, leeks, tomato, ginger, and various fruits (apple, raspberry, cherry, cranberry, blackberry, avocado, banana, peach, grape, mango and pear), nuts (hazelnut, walnut, cashew, peanut), beverages (coffee, tea, coke, cocoa, beer, wine, and soft drinks), and spices (ginger, red pepper, coriander, cumin, black pepper) are food items containing these substances. Moreover, ice cream, candies, baked products, aspartame, sodium benzoate, tartazine, colours, and dietary supplements also contain such substances [5].

Psoriasis

Although psoriasis is a hereditary disease, it is also influenced by environmental factors, such as infections, stress, and nutrition [6]. Alcohol consumption rates are high in patients with psoriasis. The intake of alcohol is associated with a concomitant increase in the intake of fatty foods and reduced consumption of fresh vegetables and fruits. Therefore, alcohol intake should be restricted in these patients [7]. 3 months of a gluten-free diet (GFD) has been proved to improve anti-gliadin antibodies and severity of the disease in patients with psoriasis [8].

Sufficient antioxidants may be helpful to prevent an imbalance of oxidative stress and antioxidant defense in psoriasis. Presence of oxidative stress increasing the formation of free radicals may play a role in inflammatory mechanism of psoriasis. Due to their high content of carotenoids, flavonoids and vitamin C, eating fresh fruits and vegetables, such as carrots and tomatoes, may be beneficial for patients with psoriasis [6].

A low-calorie and low-protein diet is generally recommended in the treatment of psoriasis (Table 1). The positive effect of the low-calorie diet may be secondary to the modifications in the polyunsaturated fatty acid metabolism, which in turn influences the eicosanoid profile, including prostaglandins and thromboxanes [1]. However, deficiency of proteins and other nutritional elements leads to hypoproteinemia and macrocytic anemia, which are known to cause psoriasis [6]. A vegetarian-based diet may higher the risk due to eating high amounts of vegetable oils and soy pro-

ducts, and low amounts of fish, which can tip the balance toward a pro-inflammatory state. Several studies have reported that fish oil has anti-inflammatory efficiency and improves symptoms, such as itching and scaling, in psoriasis [9]. Despite the absence/lack of results regarding oral fish oil supplementation, intake of oily fish including mackerel, sardine, or herring, which are rich in n-3 fatty acids, may be recommended for patients with psoriasis [6]. It is thought that as the African diet based on corn that is rich in linoleic acid, which is prostaglandin E2 precursor, suppresses cellular immunity and prevents psoriasis, the prevalence of psoriasis is very rare in Africa [10]. Seafood and iodized salt, which are rich sources of iodine, can precipitate pustular psoriasis. Drugs and therapies used in treatment of psoriasis are known to cause some nutritional deficiencies. For instance, methotrexate leads to a folic acid deficiency by suppressing appetite [11].

Herpes

Intake of foods containing refined sugar or arginine may cause recurrence of herpes. However, significance of dietary arginine resulting from causative factors has not been scientifically studied [12]. Fruits and vegetables are recommended to maintain immune system health, rather than individual dietary intakes of vitamins A, B6, C, and E, and of folic acid, zinc, and iron [13].

Scleroderma

Scleroderma is an inflammatory disease that decreases functional capacity through muscular atrophy, skin sclerosis and loss of joint function, and impairs the quality of life by affecting the nutritional status. It has been reported that patients with scleroderma are at higher risk of malnutrition due to insufficient nourishment, and thus, need a good dietary management [14]. Improvement in the skin of scleroderma on vitamin E supplementation has been reported [13]. Additionally, high-fiber diets are not

Table 1. Diets are Recommended for Various Skin Diseases

Diseases	Diets
Psoriasis	Low calorie and protein diet ω -3 and ω-6 balanced diet Gluten-free diet
Herpes	Elimination of refined sugar and foods rich in arginine Supplement of Vitamins, zinc and iron
Skleroderma	Supplement of E vitamin Elimination of High-fiber diets
Acne	Low-glycemic diet Elimination of Skim Milk
Rosacea	Prevention of hot drinks and hot food
Pemphigus	isothiol, thiol-poor and tannin-rich foods
Refsum disease	elimination of phytanic acid-rich foods

recommended for patients with scleroderma [14].

Dermatitis herpetiformis (DH)

It is a chronic, itchy skin disease that develops mostly in patients with latent gluten-sensitive enteropathy [15]. Microcytic or macrocytic anemia due to iron, vitamin B12 or folate deficiencies, tooth decay, alopecia, zinc deficiency, moderate or severe osteoporosis, weight loss, and low BMI values may be observed in patients with DH [16].

Gluten-free diet has been reported to improve enteropathy in patients with DH [17]. Therefore, these patients should avoid foods containing wheat, rye, oats, or barley. As iodides increase DH problems via local chemotaxis and stimulating neutrophil migration paths, intake of iodine-containing foods (fish, kelp, and iodized salt) should be restricted [18].

Atopic Dermatitis (AD)

It is a chronic, inflammatory skin disease that deteriorates patients' daily work and social life [19]. It has been reported that maternal supplementation with probiotics might influence the composition of the infant's intestinal microbial flora and that such supplementation might be a potential mechanism for increasing anti-inflammatory immunoregulatory factors in breast milk [20]. The purpose of prebiotic supplements is to prevent deve-

lopment of other bacteria, strengthen the function of immature or impaired intestinal barrier and alleviate abnormal immune response [21].

The prevalence of atopic dermatitis has increased in infants who were born to mothers with high folate and B12 levels during pregnancy [22]. Due to low protein and fat content, long-term usage of cow or soy milk, even enriched, may lead to insufficient protein intake and weight gain in children with AD [23]. Foods such as chocolate, cheese, coffee, yogurt, soy sauce, and fermented soybeans are reported to play an important role in activation of skin lesions in patients with AD [24].

Food allergy plays an important role in 20% of children with AD under the age of 4. AD develops in four out of every 10 children with food allergy [25]. 90% of food allergy is related to foods including wheat, milk, soy, shellfish, fish, eggs and peanuts [26]. In addition to these, gluten, corn, red meat, sugar, yeast, strawberries, citrus fruits, mushrooms, tomatoes and soy may be also allergic. After weeks of elimination, each food is added back to the diet and eczema symptoms are closely monitored per day. When no symptom develops, the food is considered safe to eat. However, if the symptoms worsen, the relevant food is eliminated from the diet at least for 3 months in order to rest the body.

On the other hand, highly restrictive diets started due to food allergy may result in severe malnutrition. A study has indicated that elimination of milk and eggs from the diets of

individuals with food allergy do not ensure improvement of symptoms [27]. However, as animal products contain arachidonic acid, which may encourage inflammatory mechanisms in the body and thus worsen eczema, consumption of all kinds of animal products should be reduced. Therefore, a diet plan should be based on foods strengthening the immune system, such as fresh vegetables and fruits, legumes, nuts, seeds, seafood, fresh fish, flax seed oil and extra virgin olive oil.

Vitamin A and beta-carotene are powerful antioxidants for skin diseases like eczema [28]. Egg yolks, liver, carrots, zucchini, pumpkin, apricots, peaches, spinach, etc. should be a part of daily nutrition. Tomato which is rich in vitamin A contains active substances, such as 5-Hydroxytryptamine, Acetone, Alpha-Oxoglutaric-Acid, Alpha-Pinene, Auroxanthin, Benzyl-Alcohol, Butanol-2-On-3, Cinnamaldehyde, Citral, Damascenone, Farnesal, Lycophyll, Methyl-Salicylate, Nestigenin, Phenyl-2-Ethanol, Pipecolic-Acid, Trans-Aconitic-Acid, and these substances set off eczema. In fact, co-existence of farnesal, lycophyll and pipecolic acid in tomato triggers eczema.

Acne Vulgaris

Patients used to be recommended to eliminate chocolate, fatty foods, sweets and carbonated beverages from their diet as a part of treatment. However, the "diet" issue has been brought to the table again because of the views claiming that the high glycemic load diets, which are poor in omega-3 fatty acids, followed by developed societies is a cause of acne lesions [29, 30].

Adebamowo et al. have indicated in their study that there is a positive correlation between acne and skim milk consumption [31]. While vegetables and fruits have been reported to alleviate acne symptoms, dairy products and fatty foods are indicated to be aggravating factors in acne [32]. It is stated in *Robyn Smith* et al. that nutrition-related "lifestyle" has a role in the pathogenesis of acne, and acne development is related to chocolate intake and other dietary factors [30].

While familial and hereditary susceptibility is important in acne development, the absence of acne in non-Western societies highlights the importance of underlying environmental factors as well as diet [33]. Androgenic effect of hyperinsulinemia may stimulate acne [34].

Ω -6 PUFAs are found in higher concentrations in a typical Western diet. While the ω -6 / ω -3 PUFA ratio in non-Westernized diets is estimated between 2.1- 3.1, it has increased to 10.1 in current American diets [35]. Therefore, an average Western diet may advance pro-inflammatory cytokines and eicosanoids profile, and thus, paves the way for various inflammatory diseases like acne. A non-Westernized diet including fresh fruits, vegetables, lean meats, fish and seafood and excluding processed foods, grains, dairy products, refined sugar and refined oil may have a beneficial effect in acne treatment.

Urticaria

Adverse reactions to food are a frequently discussed cause of urticaria. Celery, thin-shelled fruits, nuts, and walnuts are among the allergens. Pseudo-allergens include strawberry and cooking oils. As diets lacking of pseudo-allergens ensure recovery in 1/3 of the cases, it has been proved to be an economic and effective alternative therapy [36].

In acute urticaria, 63% of patients suspect food as the eliciting factor [37]. Pseudoallergic urticarial reactions have been shown to be elicited by a broad range of agents, including NSAIDs like aspirin and natural or added food ingredients like salicylates, benzoates and tartrazine (in tomatoes, white wine and herbs) [38].

Allergic Contact Dermatitis

Approximately 30-50% of individuals, who are allergic, show a hypersensitivity to some plant-derived foods, especially freshly consumed fruits. An increasing number of plant sources, such as avocado, banana, chestnut, kiwi, peach, tomato, potato and pepper, turnip, and zucchini, have been reported to be associated with the latex-fruit syndrome [39].

The oral intake of nickel can cause systemic contact dermatitis in nickel-sensitive indivi-

duals. Nickel content of the diet depends on whether the food was fresh or canned food and/or whether it was contaminated during processing or by kitchen utensils [40]. Food, water and cooking utensils are all sources of nickel in the diet. Nickel intake increases in individuals who routinely eat certain foods which are rich in nickel content, such as cocoa and chocolate, soya beans, oatmeal, nuts and almonds, and fresh and dried legumes [41, 42]. Wine, candy, chocolate, cinnamon, curry, citrus fruit, tomatoes and flavourings are among the food items most commonly mentioned by patients as causing aggravation of dermatitis. Nickel, cobalt and chromium allergies frequently coexist and patients sometimes respond to dietary restrictions of all three metals [43].

Rosacea

Tea, coffee, hot beverages, tobacco, alcohol and spicy food are known to trigger rosacea [11].

Vitiligo

Vitiligo is a skin disorder characterized by white patches resulting from the loss of skin color of the outer skin layers. The widely held belief in India is that foods that are excessively sour (citrus, sour yogurt, pickles, etc.) should be avoided by vitiligo patients. Moreover, the simultaneous consumption of milk and fish is also discouraged in these patients. Despite the absence of scientific data, these dietary advices for vitiligo patients are supported. Vitiligo may be related to junk food consumption and poor nutrition in children [44].

Aphthous Ulcers

Although the cause of oral aphthous ulcers is unknown, there is a well-established association with coeliac disease. Recurrent aphthous ulceration has been indicated to improve with gluten free diet [45].

Cutaneous Vasculitis

It occurs in response to food additives, such as dyes and preservatives [46]. It may be worthwhile to try elimination diets in cutaneous vasculitis cases.

Telogen Effluvium, Alopecia

Although hair loss has been linked to iron deficiency, there is insufficient evidence to recommend giving iron supplementation therapy to patients with hair loss and iron deficiency in the absence of iron deficiency anemia [47]. Lean meats, especially beef, have high iron contents that are highly bioavailable. Non-animal foods that are high in iron include nuts, seeds, legumes, bean products, raisins, dark green leafy vegetables, whole grains and iron-fortified cereals. Studies have showed that there is a positive correlation between hair loss and protein-energy malnutrition, starvation, and eating disorders. Profuse hair loss has been seen to occur 2-5 months after starting a vigorous weight reduction program [48]. Minimum 0.8 g/kg protein and at least 1200 Kcal should be taken per day within a slimming diet. Zinc and biotin deficiencies have also been associated with hair loss; however, there is no concrete evidence to prove their role in the same [49].

Conclusion

Just like all organs, skin functions normally when adequate nutrition is provided. Nutritional deficiency, imbalanced diet, specific nutrient inadequacy or excess and toxic components can disturb the equilibrium of the skin. Deficiencies of several vitamins, minerals, and fatty acids may lead to clear cutaneous manifestations. Efficient and balanced diet is important for protecting the skin integrity, and dietary management may have a significant role in some skin diseases.

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