



ISSN: 2456-0057

IJPNPE 2019; 4(1): 1803-1807

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www.journalofsports.com

Received: 14-11-2018

Accepted: 18-12-2018

**Satyapal Singh**

Assistant professor, Department  
of Kayachikitsa, SAMCH,  
Chunar, Mirzapur,  
Uttar Pradesh, India

## Nutrition and psoriasis: An overview

### Satyapal Singh

#### Abstract

Nutrition (Ahara) is very much emphasized in Ayurvedic system of medicine not only in the disorders like psoriasis but also in other disorders. There are ample references in Ayurvedic texts regarding the use of different dietetics or nutrition in healthy state for prevention as well as for treating many disorders. In Ayurveda Ahar is termed as 'Mahaushadha'. Poor diet/nutrition may generate chronic inflammation and it may refer as the diet-induced pro-inflammatory state. If the pro-inflammatory state is persist for longer period, it acts as the fertilizer needed to grow different types of chronic disorders. Every meal will either promote or inhibit inflammation. Here, it is important to remember that the statement of Acharya Charaka, 'Ahar Sambhavam Vastu Rogaschahar Sambhavah'. Severe inflammatory skin disorders including psoriasis have been associated with nutritional deficiencies because of an accelerated loss of nutrients. Therefore, it results in increase demand of nutrients. Thus, patient should adopt the diet like seeds, nuts, grains, vegetables and fruits, with emphasis on raw seeds and nuts and plenty of organically grown raw vegetables and fruits. These food types are easily digestible and can be assimilated faster and quicker in the human system. Diet rich in Amla Ras like citrus fruits and rich in Lavana Ras like processed foods etc. should be avoided. All animal fats, including butter and eggs, all condiments, tea and coffee, should also be avoided. There is no doubt regarding the beneficial role of proper nutrition in psoriasis but furthermore researches are needed to establish the role of diet.

**Keywords:** Psoriasis, nutrition, diet, ahar, ayurveda, rasayan

#### Introduction

Psoriasis is a chronic inflammatory and multifactorial systemic disorder with predominantly skin and joint manifestations resulting from interactions between genetic pre-disposition and triggering environmental factors. Despite the involvement of a smaller body surface area, psoriasis may interfere significantly with activities of daily life or quality of life. Therefore, severity of disease is defined not only by extent of body surface area involved but also by the involvement of particular site like hands, feet, face, or genital regions. Both genetic and environmental factors contribute to the development of psoriasis. Its pathogenesis is a complex interplay between environmental factors and genetic predisposition<sup>[1]</sup>.

Ayurveda emphasizes on consuming healthy and nutritious diet. Diet is considered to be a vital for a human body as it provides the basic nutrients. Unfortunately in modern era the concept of Hita Ahara which are having a great influence on our health is being ignored. Diet plays an important role in the etio-pathogenesis as well as in the therapeutics of psoriasis. Therefore, Patients need to be advised proper diet to take in proper way. Regarding this, there is description of some conducts of taking food in Ayurveda, named as 'Ashta Ahar Vidhi Visheshayatan'<sup>[2]</sup>. Only taking a balanced diet is not important but how to take food i.e. the eating behaviour has equal importance. If we follow the rules regarding the diet and how to eat the food then it will definitely be important to keep you healthy as well as happy.

#### Nutrition and psoriasis

Nutrients are substance that are not synthesized in the body in sufficient amounts therefore, must be supplied by the diet. Acharya Charak explained that hitakar and timely taken diet is responsible to develop our body<sup>[3]</sup>.

Usually the chronic and severe forms of psoriasis have been associated with nutritional deficiencies due to an accelerated loss of nutrients from the hyper-proliferation and desquamation of the epidermal layer of skin.

#### Correspondence

#### Satyapal Singh

Assistant professor, Department  
of Kayachikitsa, SAMCH,  
Chunar, Mirzapur,  
Uttar Pradesh, India

Furthermore, an elevated requirement of some nutrients such as antioxidants may occur. A study on 50 hospitalized patients suffering with psoriasis showed that 18% had decreased total protein, 16% had decreased serum albumin, 38% had elevated mean corpuscular volume and 39% had decreased haematocrit. These results support that patients with widespread psoriasis are at risk to develop nutritional abnormalities in protein and folate status [4]. On the other hand, dietary factors can affect a drug's pharmacokinetics and pharmacodynamics. Systemic treatment with folic acid antagonist, methotrexate which is also usually used at low doses leads to hepatotoxicity, loss of appetite and its use is also contraindicated in patients with poor nutritional status. [5] Emotional stress, smoking and other related environmental factors negatively influence the onset of symptoms and the severity of the disease. Environmental factors of high interest to patients are the influence of diet, improper nutrition, inadequate body weight and metabolic diseases which may increase the clinical symptoms or even trigger the existing disease. All strategies, with the special inclusion of nutritional strategies that can help to combat the illness and successfully prevent future major comorbidities are urgently needed. [6-8] Some studies also have shown that symptoms of inflammatory diseases such as rheumatoid arthritis, psoriasis etc. can be improved by fasting periods or low-energy diets [9-11].

There are two types of polyunsaturated fatty acids (PUFAs) are differentiated depending on the location of the first double carbon bond at the methyl radical. First is Linoleic acid. It is an essential fatty acid, belongs to the omega-6 family and is found in a large quantity in oleaginous seeds, this acid can be converted into AA, which is principally derived from meat and egg sources. Eicosapentaenoic acid (EPA) and docosahexaenoic acid are the most abundant omega-3 fatty acids in food and are found mainly in cold-water fish, such as mackerel, sardine, salmon, herring, etc. [12]

These omega-3 polyunsaturated fatty acids have been observed to change the serum and lipid composition of epidermal and blood cell membrane which established its role in the treatment of psoriasis. Two studies carried out comparing the effect of intravenous omega-3 fatty acids (Omegaven) to omega-6 fatty acids (Lipoven) for the treatment of psoriasis. In one study, 75 patients with chronic plaque psoriasis were subjected to a 14-day treatment with either intravenous omega-3 or omega-6. The result was assessed by PASI scores, which decreased by 9.8 to 11.2 in the omega-3 group versus 7.5 to 8.8 in the omega-6 group with significantly better improvement in the omega-3 group for erythema, scale and induration [13].

In another study 20 patients with acute guttate psoriasis were subjected with either intravenous omega-3 or omega-6 for a duration of ten days. The omega-3 group demonstrated greater improvement in erythema, scale and induration compared to the omega-6 group [14].

Most of the studies with fish oil supplementation showed a beneficial effect of n-3 fatty acids on the patients of psoriasis which may partly be due to the fact that the patients knew they were expected to have an improvement from the treatment. Some uncontrolled studies with EPA/DHA or fish oil supplementation with daily dosages between 2 and 12 g n-3 fatty acids reported beneficial effects on psoriasis severity [15-18].

Monounsaturated fatty acids (MUFA) are also considered as healthy dietary supplement unlike the saturated fatty acid. The most frequently consumed MUFA rich dietary supplement is extra virgin olive oil (EVOO). Traditionally, the beneficial

effects of EVOO have been attributed to its high MUFA content (oleic acid), as it protects lipoproteins and cellular membranes from oxidative damage [19].

EVOO is considered as the main source of fat while the fish, poultry, dairy products, and eggs are considered as moderate source. Furthermore, EVOO is also a good source of several phytochemicals like polyphenolic compounds, squalene and tocopherol [20].

Vitamin D is an oil-soluble vitamin which exhibit anti-proliferative and immune-regulatory effects in the patients of psoriasis. It involved in bone metabolism, calcium absorption, skeletal mineralization, calcium and phosphorous homeostasis and has numerous physiological and metabolic functions. Due to its role in proliferation and maturation of keratinocytes, vitamin D has become an important therapeutic option in the treatment of psoriasis. Vitamin D has several important functions and has a significant place in human health. A number of studies revealed a high rate of Vitamin D deficiency among aged males and females, immature adults and children [21-24].

Vitamin D deficiency is now considered as a worldwide problem. Deficiency may be due to insufficient or absent exposure to sunlight, malabsorption, accelerated catabolism from certain medications and minimal amounts of Vitamin D in human breast milk. Various types of medication or drug treatment might be responsible for Vit. D deficiency like Anti-epileptic medications such as phenobarbital and phenytoin, ATT such as rifampicin, cholesterol-lowering drugs. The deficiency resulted due to the accelerated catabolism of Vitamin D [25-30].

Various studies established that the vit. D is related with multiplication and differentiation of keratinocytes, maintains the cycle of hair follicles, suppress tumours, exhibits photo-protective, anti-inflammatory and wound healing effects. It also suppresses the production of IL-2, IL-6, and interferon gamma, which are potent mediators of inflammation [31-36].

Celiac disease is characterized by an allergy to gluten. Gluten is a type of protein found in wheat, oats, rye and barley. The disease is an entero-pathy which leads to malabsorption and atrophy of the intestinal villi. Enteropathy is associated with different extra-intestinal manifestations, such as anemia, transaminase elevation, osteopenia, neurological conditions, emotional and psychiatric disorders, auto-immune disease and dermatological problems like psoriasis. The condition improves with a gluten-free diet [37, 38].

A gluten-free diet might improve skin lesions of psoriasis even in patients without celiac disease and also have beneficial effects over other chronic inflammatory disorders like rheumatoid arthritis [39, 40].

Psoriatic patients have high concentrations of malondialdehyde, some marker of lipid peroxidation, a compromised antioxidant status with reduced levels of beta-carotene, alpha-tocopherol and selenium. Since the skin is the external covering of the body, so it is continuously exposed to various types of environmental toxins, oxidants, which leads to the formation of harmful reactive oxygen species and ultimately the oxidative stress. Oxidative stress and the increased formation of free radicals have been reported to trigger the skin inflammation. Therefore, the oxidative stress is considered as one of the most important factors in the pathogenesis of psoriasis [41-44].

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse health effects, such as decreased longevity, diabetes mellitus,

orthopaedic and respiratory disease and other related disorders [45].

Various studies demonstrated the relationship between body mass index (BMI) and psoriasis severity. Obesity is associated with the state of chronic inflammation, with high levels of TNF-alpha, IL-6 and C-reactive protein. These are further associated with progressive increase in body mass index (BMI). Some studies demonstrated that the risk of psoriasis was directly related to high BMI. The prevalence of psoriasis was approximately twice as high in individuals with a BMI of 30 or greater compared with a BMI of less than 26. [46, 47].

Various environmental factors and oxidative stress due to any cause leads in the development of obesity and metabolic syndrome. Now a days the association between psoriasis and obesity has been well established. Obesity increases the risk of developing psoriasis and aggravate the pre-existing disease and inversely the psoriasis can increase the risk of obesity. Psoriasis, insulin-dependent diabetes, depression and angina more or less have similar effect on patient's quality of life.

Metabolic syndrome is a cluster of risk factors or in other words metabolic syndrome is composed of an assortment of metabolic abnormalities that augment the risk of developing cardiovascular disease and type 2 diabetes. National Cholesterol Education Program (ATP III) Criteria for Metabolic Syndrome (2002) is as follows [48, 49]

Three or more of the following criterias.

- Abdominal obesity (waist circumference > 102 cm in men and > 88cm in women), if Asian American, then > 90 cm in men and > 80cm in women
- Triglycerides > 150mg/dl or receiving drug therapy for hypertriglyceridemia
- HDL-C < 40mg/dl in men or < 50mg/dl in women or receiving drug therapy for reduced HDL.
- BP > 130/85mm Hg or receiving treatment for hypertension.
- Fasting glucose > 100 mg/dl or receiving drug therapy for hyperglycaemia.

It is now established that Th-1 and Th-17 pathway involved in the pathogenesis of psoriasis. The Th-1 pathway involving dys-regulation and activation of Th-1 inflammatory cells is thought to contribute to obesity and insulin resistance, which can increase the risk for cardiovascular disease [50, 51].

Psoriasis and metabolic syndrome may develop interdependently due to a shared immuno-pathogenesis involving chronic low-level inflammation mediated by pro-inflammatory cyto-kines such as IFN-gamma, IL-17, IL-23, and TNF-alpha [52].

Since psoriasis is also a metabolic disease, therefore, Langhan therapy in the form of cleansing juice fast or in any other way (Depending upon the nature of patient and the disease) for about seven days is always desirable in the beginning of the treatment. Carrots, beats, cucumbers and grapes may be used for juices. Juices which are rich in Amla Ras like juices of citrus fruits should be avoided. After the juice fast, the patient should advise to take the diet from three basic food groups...

- Seeds, nuts and grains
- Vegetables and
- Fruits,

Animal fats, including milk, butter and eggs, refined or processed foods and foods containing hydrogenated fats or white sugar, all condiments, tea and coffee and others food types which are rich in Amla & Lavan Ras should also be

avoided. After noticeable improvement, goat's milk, yogurt and home-made cottage cheese may be added to the diet. Procedure for Langhan might be followed after one month as per diet schedule. Soap should not be used. Take adequate number of Neem leaves as per the requirement. Add these leaves to five litre of normal water and boil, when it get boiled take away and mix it with another ten litre of normal water. When it comes to room temperature, take bath by using it with a gentle rub on the body. Regular sea water baths and application of sea water externally over the affected parts once a day are beneficial. The hot Epsom salts bath has proved valuable in psoriasis. Take Epsom salt bath thrice weekly until the psoriasis get subside, then number of Epsom salt bath may be reduced to twice weekly and later on followed by once in a week. After taking proper bath a little olive oil or other medicated oil may be applied [53].

## Discussion

Diet or nutrition has been suggested to play a major role in the etio-pathogenesis as well as in the therapeutics of psoriasis. Fasting periods, low energy diets and vegetarian diets improved psoriasis symptoms. Diets rich in polyunsaturated fatty acids from fish oil and monounsaturated fatty acids showed beneficial effects on psoriasis. Therefore, diet enriched with PUFA, MUFA, fruits, vegetables, fibre and diet with reduced saturated fats, carbohydrates and sweetened drinks should be recommended to the psoriatic patients.

Amy C. Brown *et al.* reviewed five cases of psoriasis and discussed an important fact that the improvement of psoriasis symptoms was due to low protein intake in diet. Because epithelial proliferation relies on protein and reduced dietary protein may limit the potential amount of epithelial replication. Furthermore, excess dietary protein may lead protein indigestion which leads to the formation of toxic polyamines as bowel bacteria break down the superfluous polypeptides. Polyamines are elevated in the urine and skin of individuals with psoriasis, providing support for the concept of auto-intoxication. Furthermore, Polyamines inhibit the production of camp, leading to increased cell proliferation [54].

Supplementation with certain herbal teas can improve inflammatory conditions. Another important aspect of diet in psoriasis is elimination of alcohol. Consumption of alcohol is a known trigger of psoriasis. In addition to this various preserved food, canned food, fast food, oily and spicy food should be avoided. Carbohydrate rich diet, frequent eating habits and other types of food which increases the fat content of the body should be strictly avoided.

Daily diet regimen should be enriched with food substances which adequately fulfil the daily requirements of the various macro and micro nutrients and enriched with various vitamins like vit. A, B, C, D and E.

Human biological system requires diet or food to provide energy for all life process, growth, repair and maintenance. Balanced diet in Ayurveda can be defined as "the diet enriched with Shadarasa (All six rasa), required Gunas (Properties), Veerya and given to the individual after consideration of Prakrati, Agni (Digestive power), Kostha (Digestive system) and Ritu (Season variation). According to the Ayurveda eating milk and fish together should be avoided. Both milk and fish are the rich source of protein and the combination may generate new type of protein molecules which may exhibit molecular mimicry and generate auto-immunity [55].

Diet is considered as vital for a human body as it provides the basic nutrients and promotes longevity. Ayurveda always

emphasizes on consuming healthy and nutritious diet for maintaining good health. As per the concept of the Ayurveda food like Ghee, wheat, honey, cucumber, garlic, til oil, mustard oil, bitter food, etc. are beneficial to the psoriatic patients. It is also well established that diet enriched with antioxidants act as preventive therapy for the natural aging of skin and cancer caused by ultra violet rays<sup>[56]</sup>.

Ayurveda propounds a special concept of medicinal dietary supplements in the form of 'Rasayan'. The Rasayan drugs have various types of properties like

- Immune-modulation
- Adoptogenic
- Anti-oxidant
- Nootropic and
- Anti-stress

Due to above properties the use of Rasayan drugs is very helpful to the patients of psoriasis<sup>[57, 58]</sup>. Rasayan drugs are also considered as good bio-enhancers and if added to daily routine diet then they will definitely increase the bio-availability of various types of nutrients<sup>[59]</sup>.

### Conclusion

Food or diet is the most essential requirement of all living beings. According to Ayurveda both the living human body and the diseases that afflict it are the products of food. The Ahar (diet) is considered as very important factor in the aetiology and pathogenesis of Kushtha Roga (dermatological disorders like psoriasis). Vegetarian diets may be beneficial for all patients with skin disorders due to the low amino acid intake and the resulting reduced formation of inflammatory eicosanoids. Various types of nutrition, nutritional supplements, low-calorie or gluten-free diets and alcohol abstinence may have a role in the treatment of psoriasis and its comorbidities. Promotion of the physical as well as mental health by diet which is especially enriched with anti-oxidant food and Rasayan in daily routine is very much important to combat the chronic inflammatory disorders like psoriasis.

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