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Review Article

**THE ROLE OF NUTRITION IN MANAGEMENT OF JOINT
DISORDERS ACCORDING TO IRANIAN TRADITIONAL
MEDICINE: A NARRATIVE REVIEW**

Running Title: Diet in Joint Disorder

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Sciences**Abstract:**

Introduction: Joint disorders are considered a major burden in our health system. The annual cost of managing various joint problems in the society is remarkable. The exact role of nutrition in management of joint disorders in modern medicine is not clear. On the other hand, Iranian Traditional Medicine (ITM) has various dietary plans for a range of joint problems that can even have therapeutic effects on the disease. In this article different types of foods and diets for various joint problems were introduced according to major references of ITM.

Method: A number of major ITM references were reviewed to explore dietary approach towards rheumatologic problems. The data regarding the food instructions in each disease were collected. A search in PubMed, Google Scholar, Scopus, and some other Databases up to July 2016 was done to obtain related modern medical data about this field

Result: According to the specific disease and the type of humor involved as well as the stage of the disease, Persian medical books present a wide view regarding foods, fruits and drinks which, by adjusting the temperament, can control the disease process.

Conclusion: The use of diet in ITM plays an important role in the management of joint disorders. According to the nature of the disease the type of foods and drinks can vary. On many occasions the adjustment of food intake as a part of lifestyle management can have therapeutic effect in joint complaints. In the future, more research regarding specific dietary instructions for a variety of joint disorders is needed.

Keywords: Diet, Nutrition, Joint, Osteoarthritis, Iranian Traditional Medicine, Persian Medicine

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INTRODUCTION:

Osteoarthritis (OA) is a type of degenerative disease of the joints that occurs commonly in the middle-aged and older population with the knee being the most frequently affected site among all joints [1]. OA is the fastest growing cause of disability worldwide [2]. It is imposing significant impact on patients, caregivers and medical costs [3]. The pathogenesis of OA is not yet entirely clear although several factors may contribute to the development of OA process such as nutritional factors [2]. At present, treatment of OA is based on life style modification; control of pain and inflammation by using NSAIDs, Analgesic and surgery as the final step [4].

There are a number of dietary recommendations for OA such as losing weight, preferably combined with exercise; eating vitamin-D rich dietary sources or taking vitamin D supplements and increasing vitamin K intake by eating green leafy vegetables [2]. However, unlike modern medicine, nutrition has a major role in recovery and treatment of osteoarthritis in Iranian Traditional Medicine (ITM) a fact that needs to be supported by further studies and clinical research [5].

ITM (or Traditional Persian Medicine) is based on individual temperament or constitution. Nutritional recommendations and prohibitions are based on distemperament through which the physician can restore the balance of patient's temperament. On the other hand importance of nutrition in modern medicine is more about reduction of weight in obese people suffering from osteoarthritis [6].

The aim of this study is to investigate the role of nutrition based on ITM in joint diseases especially osteoarthritis.

METHOD:

In this study, main ITM references including: *Canon of Medicine* (10th -11th A.D.), *Al-Havi of Rhazes* (9th -10th A.D.), *Makhzan-al- Advieh and Moalejat* (Treatment) of Aghili (18th A.D.), *Eksir-e-Azam* of Azam Khan (18th and 19th centuries), *Kamel-a-Sana'at Tebiat of Ali Ibn Abbas Majusi Ahvazi* (10th AD), *Tohfah al Mo'emenin of Hakim Mo'emen Tabrizi* (17th A.D.), *Teb Akbari of Hakim Arzani* (11th and 12th centuries) and some other books such as *Tohfeh ye khani of Mohamad Ibn Mohamad Abdol'alah*, *Almojaz fi- Aldeb of Ebn nafis Qarshi*, *Kholasat-O-Tajarob of Baha al Doleh Baha-a-din Razi*, *Al mansori fi Teb of Rhazes* were studied. All of these references contained valuable material regarding nutrition in joint ailments. Furthermore, a search in PubMed, Google Scholar, Scopus, and some other databases up to July 2016 was done according to

MeSH terms such as food, diet, nutrition, joint disorders and osteoarthritis to obtain related data about this field. We included all the articles about relation of nutrition with joint disorders.

RESULTS:

There are many food recommendations and prohibitions as part of lifestyle modification in ITM for improvement of joint disease especially osteoarthritis. Most important recommendations are as follows: Limitation of food intake in obese individuals who are greedy to food [7-11], Use of soft foods with rapid digestion capacities [7-11], Exercise and activity before eating and after meal digestion [7-11]. Other recommendations include: The vegetables and Cereals or Grain [11], Bean Confection [11], Olive [12, 13], Fresh dill leaves in processed oil [12, 13], Asparagus [12, 13], Horseradish Seed with honey [12, 13], little dose of Currant and dried fig [8], Maceration of Indian tamarind [11], Honey syrup containing celery seed [11], Mountain birds and any meat with easy digestion [8], Dried bird meat, dry foods and fermented bread made from old wheat [11], Porridge and bread with bird meat [8]. Finally there is a traditional food named "Nokhodab" in Persian language which is a kind of broth containing lamb meat, chick pea, rice, spices like cinnamon, turmeric and vegetables like coriander and fenugreek [8-10].

On the other hand, the following should be avoided: Exercise and Sleep after meal [7, 8], Excessive Rest and Relaxation [7, 8], Excessive Intercourse especially after meal [7, 8], Eating different foods together in one meal [7], Overeating, especially at night [8], Foods with difficult digestion like beef [8], Drinking water on empty stomach [8] and Bathing after meal or on full stomach [7-9]. Other prohibitions are as follows: Juicy Fruits [8], Pickles [8], Wine [7, 8], Dairy products especially yoghurt and cold milk [8, 9, 11, 14], Watermelon [13], Mixture of milk and wine [15], Mixture of Rhubarb and milk [15] and Mixture of Sour Grape and Yoghurt [15]. Finally dense and heavy foods such as "Hariseh" or "Halim" which includes wheat, meat, sugar and oil (a traditional food in Persia) [16] and "Halva" another traditional Persian food made of wheat flour and sugar should not be used [8].

In ITM, Ailments are classified as simple or material distemperament based on four qualities of warmth, coldness, wetness and dryness. In simple distemperament there is no humor involved while material distemperament is due to presence of a humor which can be warm and wet (sanguine), warm and dry (choleric), cold and wet (phlegmatic), cold

and dry (melancholic). Consequently ITM presents specific recommendations and prohibitions based on the particular distemperament.

Hot distemperament:

Recommendations are; Jujube and Tamarind [8-10], Pomegranate, apple, pear [7, 8], Lemon juice [8-10], Pomegranate Oxymel [8-10], Cooked fruits [8], Soaked plums and violets with sugar [8], Partridge [17], Dense cold foodstuffs such as Lentils with vinegar [7, 17], Male goat meat, especially the hands and feet [17], Mountain animal's meat with warm Spices such as Mustard, pepper, cumin and thyme [8, 17].

Cold Distemperament:

Here the recommendations are hot spices [8-10], Poultry [7], Barley juice (boiled barley water) with honey [18], Rooster bouillon with dill and Cinnamon and Mastic [18], Chicken bouillon [18], Sparrow bouillon [18] and "*Nokhodab*" with sugar or honey [18]. Special abstinence in this distemperament includes: any kind of meat because of difficult digestion and production of harmful substances in body [7].

Dry Distemperament:

Suggested items consist of Cow milk [8-10], various kinds of broth [8-10], moderately juicy foods like soups and traditional pottage named "*Esfidbaj*" and "*Zirbaj*" in Persian language [8, 17]. "*Esfidbaj*" comprises soft meat (Chicken, goat or lamb), legumes, beans, spinach, rice, and coriander [6, 9, 17]. "*Zirbaj*" including meat, peeled chick pea, sesame oil, shelled almonds, sugar, vinegar, saffron, cinnamon, coriander and rosewater [6, 9, 17].

Sanguine Distemperament:

Recommendations for this distemperaments are: pumpkin and Cucumbers [7], Wild birds meat, Deer, lamb, Rabbit and Chicken [9, 10], Sumac pottage [9, 10], Sour grape, mung and "*Nokhodab*" [9, 10], "*Mozavareh*" that is one type of pottage without meat (a traditional food) with Mung and Almond extract [8, 10], "*Zirbaj*" [8] and "*Mozavareh*" with Pumpkin, mung bean, spinach [8, 10]. However the following foodstuffs and drinks should be avoided: Beef and goat [9, 10], "*Halva*" [9, 10], Honey [9, 10], Date juice [9, 10] and Wine especially black wine [9, 10].

Choleric Distemperament:

Specific recommendations are: Grape, plum, apricot [11], pear, peach, plum, pomegranate, apple [7, 8], Watermelon [10], Juice of Purslane [10], Juice of Cucumber seeds [10], Simple oxymel with rosewater

[10], Cold water during the meal [11], Squash [8], Lettuce [8], Poultry [11], Cold and heavy foods such as beef with vinegar, olive and plum [11], Small fishes [11], Lentil and vinegar for high concentration of blood and in summer with squash for reducing the bile [11], "*Mozavareh*" with Mung, spinach and Almond extract [8], Dense and cold foods such as "*Adasiyeh*" in which base material is lentil but like pottage is coiled with special Persian vegetables and grains with vinegar [7, 8], "*Homaziyyeh*" and "*Sekbaj*" are two other traditional Persian pottage that main characteristic of their substances is sour taste like barberry and vinegar [7, 8]. Prohibitions include: Peach [7, 8], Apricot [7, 8], Spicy, salty, fatty and sugary foods [11].

Phlegmatic Distemperament:

Advices are: Walnut [8], pine nuts [8], "*Nokhodab*" with washed olive [17], "*Nokhodab*" prepared from Poultry such as Francolin, Partridge or chicken [10]. In this distemperament avoidances include Cold water [10], Sugar beet [8], Carrots [8], Cucumbers [8], Melon [8], Juicy fruits [10], Dense meat like beef [8] and Salted fish [8].

DISCUSSION:

Our findings about the role of modern nutrition in joint ailments indicate that proper doses of microelements and vitamins can influence the severity and progression of OA. The advancements in the field of nutrition has led to the emergence of the term "nutraceutical" which is originally defined as 'a food (or part of the food) that provides medical or health benefits, including the prevention and/or treatment of a disease' [19]. Compared with a nutraceutical/dietary supplement, a functional food is a food or drink product consumed as part of the daily diet [19]. Some examples of nutraceutical or functional food for OA for which a number of studies are conducted include: COT (mixture of curcuminoids extract, hydrolyzed collagen and green tea extract) that inhibited inflammatory and catabolic mediator's synthesis by osteoarthritic human chondrocytes [20]. Phytalgic® marketed preparation which consists of capsules containing fish oils rich in omega-3 and omega-6 fatty acids, *Urtica dioica* (the common nettle), zinc and vitamin E [21]. Wobenzym® is an oral combination of natural compounds, including 288mg trypsin (from porcine or bovine pancreas), 540mg bromelain (from pineapples, *Ananas comosus*), and 600mg rutoside trihydrate (rutin; from Japanese pagoda tree, *Sophora japonica*) per recommended daily dose [22]. Flavocoxid contains a proprietary blend of free-B ring flavonoids and flavans from the root of *Scutellaria baicalensis* (Chinese skullcap) and the

bark of *Acacia catechu* [23]. It should be noted that the role of micronutrients and macronutrients in Chickpea has been thoroughly discussed by Bhagyawant *et al*; [24]. They mentioned that beans like Pea are rich sources of necessary nutrients for maintaining human life and they are natural remedies and cheap when added to food as nutraceutical [24]. Nutraceuticals used in OA have been systematically reviewed nevertheless nutritional studies in the field of OA still need a long way to go.

Studies suggest pathways through which nutritional factors might influence the natural course of OA. Nutritional factors can be hypothesized to influence the course of OA through a variety of mechanisms [5]. For example in previous studies, diet and nutrition (macronutrient and micronutrient or vitamins) had been evaluated only for reduction of weight or for their role in process of remission of joint degeneration; because high BMI and some nutritional factors are considered to be important in pathophysiology of OA. Here are some of these studies: Feeding a food with a high concentration of omega 3 fatty acid, a low omega-3/ omega-6 ratio, and increased levels of methionine and manganese improves the clinical signs of osteoarthritis in cats [25]. Patients with knee OA had higher levels of Cu and value of Cu/Zn and lower levels of serum Zn and Se, these changes were potentially correlated with the duration and severity of disease; Zinc and selenium supplementation to reduce severity of knee OA should be further investigated [26]. Vitamin D deficiency is associated with clinical and radiographic knee osteoarthritis in elderly women [27].

Some studies have shown contradictory results: in the study conducted in female twins unlike other papers, vitamin D, calcium and other bone biomarkers had no effect on osteoarthritis [28] while there was no difference in calcium, magnesium and phosphorus intake in relation to the presence and stage of knee joint osteoarthritis. A significant tendency to a lower intake of the majority of microelements (iodine, fluorine, Sulphur and selenium) and vitamins was noted in women with stage II–III of knee osteoarthritis. In women with osteoarthritis, also a lower intake of vitamins and vitamin- like substances (choline, pantothenic acid, biotin and Riboflavin) was noted while another study showed no reliable differences in daily vitamin D and C intake in women with osteoarthritis [29]. One study showed that there is dose–response, positive association between beer consumption and knee /hip OA. In addition, no significant association with OA was identified for

non-alcoholic beverages including tea, coffee or pure fruit juice for both knee and hip OA [30].

The concept of nutrition and disease has been viewed from other perspectives as well. For example rational nutrition is nowadays regarded as an active method of prophylaxis and treatment, which enables us to maintain physical and psychological health, decreases the risk of health disorders and musculoskeletal diseases and prevents premature aging [29].

ITM introduces a wide range of foods and diets in management of OA. However due to the difference in the basic philosophy of this medical system, comparison of the dietary regimen of ITM with that of modern nutrition can be a difficult task which needs further investigation. By investigation of various food items recommended in Persian texts we come across a popular recipe which can be used in nearly all types of joint diseases, known as “*Nokhodab*”. Preparation involves soaking chickpea overnight, peeling its next morning and boiling it with water, cardamom, turmeric, saffron, carrot, onion and lamb meat, although there are various ingredients used in other types of “*Nokhodab*”.

CONCLUSION:

Joint disorders are important medical conditions in which the role of proper nutrition and diet can be vital. ITM suggests a wide range of foods for this disease based on the particular type of joint ailment. While modern nutrition focuses on micronutrients and nutraceuticals and vitamins in the diet, ITM explains several food preparations and eating habits along lifestyle management for this condition. We hope to witness more researches exploring the relationship between Traditional diets and joint disorders.

Conflict of interest:

The authors declared no conflict of interest regarding to this article.

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