

Dietary Supplements and Herbal Medications: An Overview

M.Madhumitha¹, S.Nivetha¹, J.Ashwini¹

¹Department Of Pharmacy Practice, K.K. College Of Pharmacy, Chennai, Tamil Nadu

Submitted: 10-15-2023

Accepted: 20-12-2023

ABSTRACT:

The article provides a comprehensive overview of dietary supplements and herbal medicines, emphasizing their diverse forms and applications. It explores the reasons individuals turn to supplements, covering aspects like general health improvement, performance enhancement, and disease-specific uses such as cancer, seizures, cardiovascular issues, Parkinson's disease, arthritis, weight loss, dermatological conditions, and pregnancy. The potential risks of self-medication are discussed, including adverse effects, interactions with medications, and the importance of caution, especially in vulnerable populations. Additionally, the article addresses critical aspects including interactions with conventional drugs, anticipating adverse effects, and toxicities, and provides insights into the management of associated complications. The importance of discussing supplement use with healthcare professionals and providing guidelines for safe consumption concludes the article, emphasizing the significance of maintaining a balanced approach to nutrition for overall health.

KEYWORDS: dietary supplements, herbal medicines, safe consumption, self-medication

I. INTRODUCTION:

A dietary supplement is a product that is intended to supplement one's diet by taking pills, capsules, tablets, powder (or) liquid. These include vitamins, minerals, fiber, fatty acids, and amino acids. The World Health Organization and the Dietary Supplement Health and Education Act of 1994 define "dietary supplement as a product intended to supplement the diet that bears (or) contains one (or) more of the following dietary ingredients a vitamin, a mineral, an herb (or) other botanical an amino acid, a dietary substance".^[1]

Herbal medicines are one type of dietary supplement. They are sold as tablets, capsules, powder, teas, extracts, and fresh (or) dried plants. People use herbal medicines to try to maintain (or) improve their health. Herbal substances are obtained from plants and many of them are used in

both food and medicinal products. The WHO defines herbal medicines as "finished labeled medicinal products that contain active ingredients, aerial or underground parts of the plant or other plant material or combinations, thereof, whether in crude state or as plant preparations".^[1]

The use of herbal remedies in adults parents encourages the use of herbal remedies for their children to maintain good health and to treat their illnesses. Complement and alternative medicine (CAM) refers to diagnostic and therapeutic systems. The National Center for (CAM) defines CAM as a broad domain of healing resources that encompasses all health systems modalities and practices and their accompanying theories and beliefs other than those intrinsic to the politically dominant health system of a particular society (or) culture in a given historical period.^[1]

II. WHY DO WE NEED SUPPLEMENTS?

Vitamins and minerals are essential to helping your body develop and improve its functions. Supplements support your body's needs to stay healthy. The most common reason for supplement use is to compensate for inadequate diet, improve strength and power, benefit performance, promote tissue growth and repair, and meet abnormal demands of hard training or frequent competition. Amino acids such as glutamine, leucine, lysine, arginine, and ornithine promote muscle growth.^[2]

III. SELF-MEDICATION WITH DIETARY SUPPLEMENTS AND HERBAL MEDICATIONS:

The most common reasons for taking an herbal product (or) dietary supplement were to improve general health management (or) prevent colds (or) to improve memory. Self-medication is defined as the use of medicines to treat self-recognized conditions (or) symptoms. But there are some potential risks of self-medication. Example: incorrect self-diagnosis, severe adverse reactions, dangerous drug interactions, risk of addiction.

These are used by patients on their own without the knowledge of and control by their physicians. They may also be at the risk of intoxication. Self-medication of herbals is also used for many conditions like anxiety, depression, and other conditions. Dietary supplements may interact with your medications (or) produce risk if the patient has certain medical problems (or) going to have surgery.

Many dietary supplements haven't been tested in pregnant women, nursing mothers (or) children some dietary supplements may produce harm if there is a particular medical condition (or) a risk factor. Example: Herbal supplements St. John's wort makes many medications less effective.^[3]

IN CANCER:

Many dietary supplements are taken as a part of lifestyle but some are also taken for specific chronic diseases such as heart disease, cancer, and certain birth defects and are also used in sleep management and to improve physical performance. In cancer, supplements like vitamin E 15 mg/d, vitamin C 90mg/d for men and 75mg/d for women may be beneficial in the treatment. Soy protein and isoflavones are also used in cancer therapy. Soy protein reduces the serum cholesterol levels and it also reduces the risk of breast cancer.^[4]

IN SEIZURES:

Most studies have reported that some herbal medicines have antiseizure properties with animal models. Examples: *Casimiroa edulis* seed extracts, *Rosmarinus officinalis*, *Seutellaria lateriflora*, *Ashwagandha*, *Brahmirasayan*, and *Brahmigritan* have been used for centuries to control seizures. Some herbal medications and dietary supplements known to be associated with seizures in humans include black cohosh root (*Amituga racemose*), bearberry, *Herba ephedra*, *aspartamine* etc. *St. John's wort* is used in treating depression. *Qingyangsen* is used in combination with phenytoin to reduce the early production of fos protein and inhibit the transcription of secondary genes leading to acute seizures. The most common and important Japanese medicine used is TJ-960 which is a mixture of nine herbal drugs.^[5]

IN CARDIOVASCULAR DISEASE:

Results from clinical trials show that leaf extracts of ginkgo biloba can reduce the symptoms of age-associated memory impairment and

dementia, and also that is associated with Alzheimer's disease. It is also useful in preventing and treating CVD, especially ischemic cardiac syndrome. Garlic may be used in the treatment of hypertension as it may reduce blood pressure but the effect is mild. Amla also called Indian gooseberry is an herb used in the treatment of hypercholesterolemia. Danshen is a Chinese herb root that is used to treat cardiovascular disease.

Dietary supplements such as coenzyme Q10 also called ubiquinone is used to treat myocardial infarction, congestive, heart failure, and tissue reperfusion injury. Vitamin E can reduce the risk of coronary heart disease. Soy protein reduces serum cholesterol levels and reduces the risk of heart disease. Dark meat fish which includes blue fish, salmon, mackerel, and swordfish are rich in omega-3 fatty acids. Cod liver oil and tuna oil are also good source of omega-3 fatty acids. Fish oil contains EPA, DHA, and omega-3 fatty acids which have antiarrhythmic, antithrombotic, and mild antihypertensive effects.^[6]

IN PARKINSON'S DISEASE:

Lipoic acid a compound that is naturally synthesized in the body and is also found in several foods exhibits antioxidative and anti-inflammatory activity and is said to help in reducing dyskinesia side effects related to L-DOPA administration. Vitamin E and vitamin C may be used to slow down the progression of PD curcumin which is extracted from the rhizome of *curcuma longa* has antioxidant, anti-inflammatory, and neuroprotective activities which have a positive impact on the treatment of PD. It is found that vitamin B₃ (niacin) has neuroprotective and antioxidant functions at low doses which may be beneficial in PD. Ginkgo Biloba extracts may also be used which increases neuronal survivability.^[7]

IN OSTEOARTHRITIS AND RHEUMATOID ARTHRITIS:

Boswellia is an herb that has anti-inflammatory activity inhibition of microsomal prostaglandin E₂ reducing the production of (or) activation of inflammatory mediators and also as analgesic and anti-arthritic effects. It may be beneficial in arthritis by improving the knee joint gap and reducing osteophytes and inflammatory mediators related to OA. Curcumin (150mg/day oral) may help reduce the OA knee pain. *Radix Paeonia* the roots of *P. lactiflora* Pallas may be used in the treatment of RA and it has been found that patients treated with *Tripterygium wilfordii* alone

(or) in combination with MTX showed better outcomes.^[8]

IN WEIGHT LOSS:

The dietary and herbal supplements that are used in weight loss follow several mechanisms which include 1. Increase in energy expenditure- E.g. ephedra, caffeine, guarana, bitter orange. 2. Increase in satiety- E.g. guar gum, psyllium. 3. Increase of fat oxidation- E.g.: hydroxy citric acid, green tea, fish oil, capsaicin, and carnitine. 4. Blocking of dietary fat absorption- E.g. chitosan. 5. Modulation of carbohydrate metabolism- E.g. chromium. 6. Increase of fat excretion- E.g.: calcium. 7. Increase water elimination- Eg: dandelion and cascara.^[9]

IN DERMATOLOGICAL PATIENTS:

Herbal medications are widely used for dermatological disorders. In acne treatment, tree oil, Mahonia, and Saccharomyces have become a standard treatment. Mahonia, Hypericum, Glycyrrhiza, and some Chinese traditional medicines are used in the treatment of Atopic dermatitis. Plant-derived substances such as dithranol and 8-methoxypsoralen are used in psoriasis. Oral and topical administration of plant extracts like green and black tea, and coffee can protect skin from UV-induced erythema, early aging, and irradiation-induced cancer. In melasma, vitamin C is used to reduce dopaquinone and prevent the formation of free radicals. Beta-carotene increases the immune defense by enhancing the cytotoxicity of macrophages against tumor cells. It also increases the production of T and B cell activity. Oral and topical administration of vitamin A has beneficial effects in squamous cell carcinoma.^{[3] [10] [11]}

IN PREGNANCY:

The two supplements that are important during pregnancy are folic acid and Vitamin D. Consumption of folic acid around the time of conception may reduce the risk of neural tube defects. Insufficient vitamin D during pregnancy may affect the infant's bone health. For pregnant and breastfeeding women, the recommended nutrient intake is 10µg per day, and a supplement providing this amount is recommended. Ginger may be used to treat nausea and vomiting in pregnancy. Partuspreparatus, is herbal medicine used to prepare the uterus for labour. Postmenopausal women may use OTC therapies for the treatment of hot flashes. Herbal medicines like

black cohosh, red clover, ginseng, and evening primrose oil may be used.^{[3] [12] [13]}

IV. INTERACTION WITH OTHER DRUGS:

There are many causes of adverse events to herbal medicines which can be divided into direct and indirect reasons. The direct reason is the intrinsic toxicity of some herbs at their normal therapeutic dosage (or) in overdose. Example: Ephedra, Aristolochia, and Aconitum can produce toxicity in humans. External toxicity may be due to contamination of products with toxic metals adulteration, misidentification (or) substitution of herbal ingredients improperly processed or prepared products. Example: caulis akebiue can be replaced by caulis arisolochiaemanashuriensis may lead to aristolochic acid nephropathy. Herbal remedies (or) dietary supplements may produce adverse effects (or) interactions with commonly prescribed drugs. Potential interactions are found in patients receiving anticoagulant interactions.

In patients who are receiving anticoagulants interactions are found between the anticoagulant warfarin and St. John's wort, ginkgo, garlic, and ginseng. Ginkgo in combination with NSAIDs such as aspirin can cause severe

bleeding including intracranial bleeding. St. John's wort which is also used to treat mood disorders may be used in patients who are receiving cardiovascular medications and it is found that there are potential interactions with verapamil and stains which causes decreased serum levels of these drugs. Blood pressure and lipids levels should be monitored if the patient is on verapamil and stains along with St. John's wort. In patients who are receiving diabetes medications, there is not much supplement drug hypoglycemic activity in patients with diabetes and this may be additive to patients who are taking oral hypoglycemics (or) insulin. Chromium and Psyllium also have hypoglycemic effects.^{[14] [15]}

V. WHEN TO ANTICIPATE ADVERSE EFFECTS AND TOXICITIES:

Certain adverse effects and toxicities may arise while using herbal medications and dietary supplements which may be due to inappropriate indications or prepared inappropriately, used in large doses or for a prolonged period. Eg: excessive and prolonged intake of vitamin A can lead to osteoporosis and hepatotoxicity. In Belgium in the early 1990s, Stephania tetrandra was used for

weight loss, Aristolochiafangchi was taken instead which led to renal failure in patients.

Herbal medications do not provide immediate effects. If it shows to provide immediate effect physicians must see for potential toxicities and adulteration. Patients who are at extremes of age, with chronic illness, with impaired organ functions, and on medications with narrow therapeutic indexes such as warfarin are at high risk of drug-herb interactions.

Allergic reactions to dietary supplements and herbal medications are common and underreported. These reactions may include mild reactions like pruritus and urticaria and more severe reactions like angioedema and anaphylaxis.^[16]

VI. MANAGEMENT OF TOXICITIES:

Toxicities from dietary supplements and herbal medicines have different managements. The patient may not inform the physician about the use of dietary supplements and herbal medicines when the toxicities arise, the patient may not know that the dietary supplements and herbal medicines are causing problems and may contain to take without aware of it. Patients who present with medical conditions such as cardiac dysrhythmias (or) seizures require immediate stabilization. Once the problem is identified the use of the product cannot be stopped (or) altered and appropriate therapy can be initiated. Resuscitative, symptomatic, and supportive care is given to patients with poisoning. Sometimes the agent may not be identified (or) the specific antidote may not be available at that time resuscitative, symptomatic, and supportive care are more important. For toxicities with Aconitum species (or) colchicine should undergo gastric lavage with adequate airway protection activated charcoal can be given in acute overdose of toxic dietary supplements and herbal medicines if there is adequate airway protection. In patients with agitation (or), seizures can be managed with benzodiazepines. In patients with sodium channel effects such as wide QRS complexes. Shock can be managed with sodium bicarbonate and class IB anti-arrhythmic such as lignocaine can be used if sodium bicarbonate fails.^[16]

VII. DISCUSSING DIETARY SUPPLEMENTS AND HERBAL MEDICINES WITH PATIENTS:

When opportunities arise the use of dietary supplements and herbal medicines can be

discussed with patients and their family members. Some advice that can be discussed with patients are

1. Dietary supplements and herbal medicines should be considered as medicines. So, dosage recommendations should be followed and long-term therapy should be avoided. If you are not sure about the product and whether it is safe and useful (or) it will interact with the prescription always consult a physician (or) pharmacist first.
2. Always purchase dietary supplements and herbal medications from reputable sources. This would reduce the chance that products may contain contaminants (or) adulterants.
3. If you are getting herbal medicine consult an herbal practitioner. If new symptoms develop during the use of these products, stop using the product and consult a physician.
4. Young children, and women who are pregnant (or) nursing should avoid using herbal medicines (or) dietary supplements (except folate and iron supplements) if possible.^[16]

VIII. CONCLUSION:

As our lifestyle is now getting improved in technology we are moving away from nature. As herbal medications are natural products most of them are free from side effects, they are comparatively safe, eco-friendly, and locally available. A well-balanced nutritional supplement is required for the normal growth and development of an individual. Any increase or decrease in the nutrients may lead to certain disease conditions. Good nutrition promotes not only better physical health but also reduced susceptibility to diseases.

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