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A MINI REVIEW: THE ROLE OF DIETARY SUPPLEMENTS IN IMPROVING HEALTH OUTCOMES OF CHRONIC DISEASES IN ELDERLY PATIENTS

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ABSTRACT

The goal of the medical specialty of geriatrics is to treat the complicated needs of elderly patients while highlighting the need of preserving functional independence in the face of chronic illnesses. A unique and comprehensive strategy is needed when treating elderly individuals. By preventing and treating illnesses and disabilities in older persons, geriatric medicine seeks to improve health. Because aging is associated with an increased risk of chronic diseases, impairments, and mortality, developing effective nutritional interventions to promote healthy aging is an active but difficult study topic. Chronic disorders including dementia, diabetes, and cardiovascular diseases are becoming more common as the world's population ages. This review emphasizes how phytochemicals and dietary supplements might enhance longevity, prevent disease, and improve health outcomes for senior citizens. One important element affecting variations in the frequency and pathophysiology of infections is nutritional condition. Due to a variety of social, physical, financial, and psychological obstacles to a balanced diet, older persons are especially susceptible to micronutrient deficiencies. As a result, it is imperative to give methods that prevent aging-related chronic disorders top priority. Additionally, people need to put forth more effort to develop healthy lifestyle habits, such as eating a more nutrient-dense diet. The phytochemicals of nutraceutical importance for the elderly population are the main topic of this review.

Keywords: Geriatrics, Nutraceuticals, Dietary supplements, Disease prevention.

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INTRODUCTION

Geriatrics is the branch of medicine focused on the care of elderly individuals, while gerontology is the study of the physical and psychological changes associated with aging. India's aging demographic presents unique challenges that require attention to the physical, emotional, and economic health of older adults. Geriatric syndromes, characterized by their multifactorial nature, necessitate an integrated approach to maintain function and quality of life. Individuals aged 60 and above are classified as elderly [1-4]. This population is often overlooked and faces numerous medical, social, psychological, and economic issues, creating a significant burden on the country. There is an urgent need to understand the challenges faced by the elderly to

ensure timely detection and management, ultimately improving their quality of life and reducing the overall burden [5-7]. Geriatric syndromes consist of interconnected symptoms or problems related to aging, with multifactorial causes and a chronic progression. These conditions can interact with one another, leading to a detrimental cycle that further diminishes functional and homeostatic reserves, increasing the risk of disability [8].

Classification of the Elderly Based on Functional and Cognitive Status

A. Group I Elderly (Functionally and Cognitively Fit): Nutrition, exercise, and psychological support are among the health promotion activities that this group needs. In addition to encouraging bone health

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and immunization, the objective is to keep children cognitively and physically active while screening for common disorders including diabetes, hypertension, cancer, and sensory impairments.

B. Elderly People in Group II (Mild Cognitive Impairment or Functional Limitations): People in this group, who are usually between the ages of 70 and 80, require continual medical support, help with everyday life, and access to specialized geriatric clinics for thorough evaluation and rehabilitation. The goal is to enable them to live independently with support.

C. Group III Elderly (Severe Functional Limitations or Cognitive Limitations): Home surroundings that are supportive are necessary for this group [9-13].

Epidemiology of Geriatrics

Global and Indian demographic trends show that nations have seen an aging population over time, with a growing share of elderly people, burdening the working-age population. Proportion of the elderly population is 8.2%. Whereas population growth rate is 1.9% and old age dependency ratio is 14.2.

NUTRACEUTICAL

The term "nutraceutical" was coined by Dr. Stephen De Felice in 1989, combining the words "nutrition" and "pharmaceutical." Nutraceuticals are bioactive compounds derived from food that can prevent or treat diseases and enhance health. They include vitamins, minerals, amino acids, probiotics, and plant extracts. Proper classification and regulation, such as those enforced by FSSAI in India, are crucial for ensuring the safety and efficacy of these products [14].

From addressing dietary deficiencies to concentrating on human health and the prevention and treatment of chronic diseases, the science of nutrition has undergone tremendous change. Since Dr. De Felice first proposed the idea, the terms "nutraceuticals," "food supplements," and "dietary supplements" have become popular. Nutraceuticals and food supplements are not clearly distinguished by regulatory bodies. Recent research highlights the necessity of redefining nutraceuticals in light of their toxicity, safety, and effectiveness [15].

Food items are nutritious substances that are consumed to support growth, sustain life, and supply energy. Nutrient separation from various food items is now widely acknowledged and used. In order to distinguish between nutraceuticals and food/dietary supplements, safety and efficacy studies that examine their mechanisms of action should come after the identification of an epidemiological target. One method to differentiate these formulations is to characterize "food supplements" as substances that make up for deficits in macronutrients or micronutrients, whereas "nutraceuticals" must be backed by solid

scientific evidence in order to be used to treat pathological disorders.

Nutraceuticals may be classified as:

A. Derivatives of isoprenoids (terpenoids, carotenoids, saponins, tocotrienols, tocopherols, and terpenes)

B. Phenolic compounds (isoflavones, flavanones, flavonoids, anthocyanins, lignins, tannins, and coumarins)

C. Derivatives of carbohydrates, such as fatty acids, oligosaccharides, ascorbic acid, and nonstarch polysaccharides

D. Structural lipids, including lecithins, conjugated linoleic acid, monounsaturated fatty acids, n-3 polyunsaturated fatty acids, and sphingolipids

E. Derivatives of amino acids (amino acids, isothiocyanates, indoles, folate, choline, allyl-S compounds, and capsaicinoids)

F. Microorganisms (prebiotics, probiotics)

G. Minerals (K, Se, Zn, Cu, and Ca) [16-21].

DELIRIUM

Delirium is a clinical syndrome that typically occurs in the elderly, characterized by confusion and attention deficits, and is often preventable. It develops rapidly, fluctuating throughout the day, and can present with a variety of psychomotor behavioral disturbances, such as hyperactivity or hypoactivity, along with disruptions in sleep duration and architecture. By definition, delirium arises from an underlying medical condition and cannot be better explained by a pre-existing, evolving, or established neurocognitive disorder. The causes of delirium can vary widely, including factors that disrupt the baseline homeostasis of a vulnerable patient. Substance abuse or withdrawal, adverse drug reactions, infections, surgeries, metabolic disorders, discomfort, and even minor ailments like constipation or urine retention are among examples. Delirium is frequently misdiagnosed because of its modest clinical signs, particularly in the hypoactive variety. According to the American Geriatrics Society Expert Panel on Postoperative Delirium in Older Adults, delirium is harmful, often avoidable, and linked to high expenses, increased morbidity, and mortality [22].

Etiology

Delirium manifests as a stress response affecting the central nervous system in vulnerable patients. The pathophysiology of delirium is not fully understood, and it likely arises from multiple etiological factors. Although the exact pathophysiology of delirium is unknown, it most likely results from a variety of etiological variables. Potential pathophysiological causes are described by a number of theories, which imply that each delirium episode may involve one or more of these theories in a complicated interplay. According to multifactorial theories, delirium occurs when a susceptible patient interacts with

predisposing variables and is subjected to harmful insults or precipitating events. Predisposing and precipitating factors are the two types of risk factors associated with delirium. Older age (over 70), dementia (which is frequently not diagnosed clinically), functional impairments, male gender, poor vision and hearing, and mild cognitive impairment are common risk factors. Delirium risk has also been associated with laboratory abnormalities and alcohol use disorders.

Pathophysiology

Delirium is a complicated and multiple etiology that cannot be explained by a single mechanism. distinct theories point to distinct facets of the pathophysiology of delirium, and the delirium syndrome is probably the result of several processes happening at once. Growing older is linked to changes that reduce physiological reserve and make a person more susceptible to physical stress and sickness. Reduced cerebral blood flow, increased neuronal death, and changes in the balance of neurotransmitters that regulate stress are notable age-related changes. Neuroinflammation: Endothelial cell adhesion at the blood-brain barrier may be compromised by peripheral inflammatory insults. The central nervous system becomes inflamed as a result of this increased permeability, which causes further harm, ischemia, and neuronal death [23].

Reactive Oxygen Species

Reactive oxygen species (ROS) and reactive nitrogen species (RNS) are key mediators of cellular damage. The central nervous system is particularly susceptible to ROS due to its high lipid content and low antioxidant capacity.

Treatment and Plant-Based Drug

St. John's Wort While St. John's Wort is recognized for its mood-enhancing properties, it may also induce delirium; therefore, caution is advised when using this herbal remedy. St. John's Wort is a plant-derived compound containing five forms of hypericin and various flavonoids. Its function as a reuptake inhibitor of serotonin, dopamine, and norepinephrine is one of the main mechanisms of action that have been suggested. Serotonin, dopamine, and norepinephrine absorption at neural synapses are all decreased by this inhibition. It is thought that elevated levels of these neurotransmitters help alleviate depression. Furthermore, the supplement stimulates the cytochrome P450 system, specifically the CYP3A4 enzyme and P-glycoprotein, by activating the pregnane-X-receptor (PXR). By facilitating hydroxylation processes, the P450 or monooxygenase enzymes increase St. John's Wort's polarity and reactivity for conjugation with other polar groups. Only one oxygen atom is delivered to the xenobiotic substrate during this monooxygenase process, which splits molecular

oxygen (O₂) into water and alcohol (R-OH). St. John's Wort has been utilized since ancient Greek and Roman times for wound healing and mental health. Its dose is 300-900 mg/day, divided into multiple doses. It should be taken before meals and avoid protein-rich foods.

Dietary supplements used in delirium

Melatonin is a hormone produced by the brain that regulates sleep and circadian rhythms. Recent clinical trials suggest that melatonin and its receptor agonist, ramelteon, may be effective in preventing and managing delirium. Altered melatonin levels have been observed in individuals with delirium. Melatonin is available over-the-counter in North America.

Thiamine (Vitamin B1) an essential B vitamin, plays a vital role in energy metabolism. The deficiency in thiamine has been linked to delirium, particularly among patients with critical illnesses. Administering intravenous thiamine may help prevent delirium in hospitalized patients facing medical challenges.

ALZHEIMER'S DISEASE

Alzheimer's disease (AD) is characterized by progressive cognitive decline, marked by the presence of amyloid plaques and tau tangles. Ginkgo biloba is noted for its neuroprotective and circulation-enhancing effects, which support functions such as memory, comprehension, language, attention, reasoning, and judgment. Although AD itself does not directly lead to death, it significantly increases vulnerability to other complications that can ultimately result in mortality [24].

Symptoms

Alzheimer's disease's early symptoms are frequently mistakenly linked to stress or age. Up to eight years before a clinical diagnosis of Alzheimer's disease is confirmed, modest cognitive impairments might be found by thorough neuropsychological testing. Complex everyday activities may be greatly impacted by these early symptoms (Bäckman et al., 2004). Short-term memory loss is the most common weakness, which shows itself as trouble remembering recently taught material and difficulties learning new information.

Pathophysiology

The loss of neurons and synapses in the cerebral cortex and certain subcortical areas is the hallmark of Alzheimer's disease, which causes observable atrophy in afflicted regions such the temporal and parietal lobes, as well as portions of the frontal cortex and cingulate gyrus (Wenk, 2003). Brainstem nuclei, especially the locus coeruleus in the pons, also undergo degeneration. When compared to comparable scans of healthy older persons, MRI and PET investigations have revealed decreases in the size of particular brain regions in people with Alzheimer's disease as they advance

from mild cognitive impairment to full-blown AD. Under a microscope, the brains of people with Alzheimer's disease exhibit both neurofibrillary tangles and amyloid-beta (A β) plaques, especially in the hippocampus. Neurofibrillary tangles in the neocortex, however, are not always present in AD. A β plaques are thick, mostly insoluble deposits of cellular debris and amyloid beta peptide that surround and surround neurons. In contrast, clumps of the microtubule-associated protein tau, which becomes hyperphosphorylated and builds up inside the cells, make up neurofibrillary tangles. While many older folks may experience some plaques and tangles as they age, people with Alzheimer's disease have noticeably more of them in particular areas of the brain, such as the temporal lobe. Lewy bodies are also frequently found in the brains of Alzheimer's patients [25].

Plant Based Treatment

No cure, but medications manage symptoms. Ginkgo biloba, a flavonoids is used. It enhances Brain Circulation: Ginkgolides and Bilobalide improve blood flow, ensuring better delivery of oxygen and nutrients. Flavonoids reduce oxidative stress, thereby protecting neurons from damage. It inhibits the aggregation of beta-amyloid, a key factor in the progression of Alzheimer's disease.

Ginkgo biloba is an ancient tree species from China, traditionally used in Chinese medicine to enhance brain function and circulation. It was introduced to Europe in the 18th century and is now widely used as a dietary supplement. Dosage: The typical daily dosage ranges from 120 to 240 mg, divided into multiple doses. It is best taken with meals, and effects may take several weeks to manifest. Avoid use if on blood thinners, before surgery, or if pregnant. It may also interact with medications for diabetes and epilepsy.

Dietary Supplements for Alzheimer's Disease

Omega-3 Fatty Acids: Omega-3s, particularly DHA, are believed to support brain health. Some studies indicate a correlation between high omega-3 intake and a reduced risk of dementia or cognitive decline. The MIND diet, designed for dementia prevention, recommends consuming omega-3-rich foods like salmon on a weekly basis. **Vitamin E** acts as an antioxidant that may help protect brain cells from damage. Some studies suggest that it might slow functional decline in individuals with Alzheimer's, although results have been inconsistent. It's important to note that research on vitamin E supplementation has produced mixed results.

RHEUMATOID ARTHRITIS

An autoimmune disease that damages the joints over time is called rheumatoid arthritis (RA). The anti-inflammatory and antioxidant qualities of grape seed extract are well known. RA is a chronic

inflammatory disease that mostly affects the synovial joints and is caused by a combination of environmental variables, including tobacco smoking, and hereditary factors. Usually symmetrical, the disease starts in tiny peripheral joints and, if ignored, can spread to proximal joints. Joint inflammation can eventually cause the joint to deteriorate, resulting in bone erosion and cartilage loss. Early RA is defined as having symptoms for less than six months, whereas established RA is defined as having symptoms for more than six months [26-28]. RA is a progressive illness that increases morbidity and mortality if left untreated. The lack of a precise scientific test makes it difficult to diagnose RA in its early stages. For diagnosis and to avoid crippling joint degeneration, a thorough clinical approach is crucial. Both pharmaceutical and non-pharmacological treatments are used to treat rheumatoid arthritis. Early treatment with disease-modifying anti-rheumatic medications is currently part of the standard of care. Many patients eventually develop severe morbidity and impairment despite treatment. A thorough combination of pharmacological and non-pharmacological interventions—such as physical therapy, counseling, and patient education—is necessary to improve clinical outcomes.

Etiology

Genetics plays a major role in the genesis of RA, which is thought to result from a patient's genotypes interacting with environmental variables. In the UK, a nationwide study of 112 dizygotic (DZ) and 91 monozygotic twin pairs found that the DZ concordance rate was 5% and the MZ concordance rate was 15%. Rheumatoid arthritis is thought to have a heritability of roughly 20% for seronegative RA and between 40% and 65% for seropositive RA. Certain HLA-DRB1 alleles, such as HLA-DRB104, HLA-DRB101, and HLA-DRB1*10, have been associated with an increased risk of rheumatoid arthritis. In the third hypervariable area of their DRB1 chain, these alleles share a conserved sequence of five amino acids called the "shared epitope" that is linked to a higher risk of developing RA. Additionally, polymorphisms in other genes, such as PAD14, PTPN22, CTLA4, IL-2RA, STAT4, TRAF1, CCR6, and IRF5, have been linked to RA. Single nucleotide polymorphisms (SNPs) in the PSORS1C1, PTPN22, and MIR146A genes are associated with severe disease. Certain genetic polymorphisms related to RA have also been identified in different ethnic groups [29].

Pathophysiology

Rheumatoid arthritis (RA) can be triggered in some genetically predisposed individuals by environmental factors, with tobacco use being a prime example. A. ACPA-positive RA is more

common in patients with the HLA-DRB1 "shared epitope" gene. Although a number of other autoantibodies are also somewhat specific to RA, rheumatoid factor (RF) and anti-citrullinated protein antibodies (ACPA) are the most well-known autoantibodies in RA. The condition is known as seropositive RA when these antibodies are present. Any isotype of RF is an antibody that attaches itself to the Fc region of IgG. Antibodies against centuplicated proteins, which were initially discovered in 1964 as the antiperinuclear factor and again in 1979 with the discovery of anti-keratin antibodies, are also present in many RA patients. In the 1990s, these antibodies were confirmed to have high specificity for RA, particularly toward filaggrin, a centuplicated peptide. The epitope for these antibodies consists of centuplicated peptides. A cyclic centuplicated peptide (CCP) was synthesized for use in an ELISA test to detect these antibodies in clinical settings, leading to the identification of anti-cyclic citrullinated peptide antibodies (ACPA) [30].

Plant-Based Treatment

While there is currently no cure for rheumatoid arthritis, clinical studies suggest that early intervention with disease-modifying antirheumatic drugs (DMARDs) can lead to a greater likelihood of symptom remission. If medications do not effectively prevent or slow joint damage, surgical options may be considered to repair the affected joints. Surgery can help restore joint function, alleviate pain, and improve overall mobility.

Possible surgical procedures for rheumatoid arthritis include Synovectomy, Tendon repair, Joint fusion, and Total joint replacement.

Grape seed oil, extracted from grape seeds, is one potential plant-based treatment option. Grape seed extract is rich in proanthocyanidins, particularly oligomeric proanthocyanidins (OPCs), which are potent antioxidants. These compounds help neutralize free radicals that are elevated in rheumatoid arthritis (RA), contributing to joint damage and chronic inflammation. Grape seed oil contains linoleic acid (an omega-6 fatty acid) and vitamin E. Vitamin E has been shown to reduce the production of cytokines, such as TNF- α and IL-1 β , which are significant contributors to inflammation in RA. Additionally, the oil may modulate NF- κ B signaling, a critical inflammatory pathway activated in RA. The OPCs found in grape seed extract (and to some extent in the oil) can inhibit matrix metalloproteinases (MMPs), enzymes that play a role in the degradation of cartilage and bone [31].

Immunomodulatory Properties: Compounds in grape seed extract may downregulate T-cell activation and other immune responses, potentially decreasing autoimmune activity.

Most research has focused on grape seed extract (GSE) rather than grape seed oil, as the extract is

much more concentrated in proanthocyanidins, the key bioactive compounds. While grape seed oil has been investigated in animal models of arthritis for its anti-inflammatory and antioxidant effects, human clinical data remains limited.

Combination therapies, such as pairing grape seed extract with methotrexate or NSAIDs, have been studied in preclinical models and demonstrate synergistic effects in reducing inflammation and joint damage.

Grape seed extract is used 100–300 mg/day (standardized to 95% proanthocyanidins). As allergy risk is rare; however, individuals with grape allergies should avoid it.

Dietary Supplements

Used in Rheumatoid Arthritis Omega-3 Fatty Acids (Fish Oil). Omega-3s, particularly EPA and DHA found in fish oil, possess anti-inflammatory properties that can alleviate joint pain and stiffness in RA patients. Approximately 1,000–3,000 mg of combined EPA and DHA per day.

Curcumin, the active compound in turmeric, exhibits anti-inflammatory effects and may help reduce joint pain and swelling. Typically 500–1,000 mg of curcumin per day, preferably taken with black pepper (piperine) to enhance absorption.

Glucosamine and Chondroitin supplements may support cartilage health and alleviate joint pain, although the evidence for their effectiveness in rheumatoid arthritis (RA) is mixed. 1,500 mg of glucosamine and 1,200 mg of chondroitin daily.

Vitamin D is essential for immune function, and RA patients may often be deficient in it. Supplementation can support bone health and help reduce inflammation. 1,000–2,000 IU per day, with higher doses recommended for those with deficiencies.

As an antioxidant, Vitamin E may help reduce oxidative stress, which is elevated in individuals with RA. 100–400 IU per day.

TYPE 2 DIABETES MELLITUS

Type 2 Diabetes Mellitus (T2DM) is characterized by insulin resistance and elevated blood glucose levels. Flaxseed shows promise for glycemic control and lipid regulation.

Its causes are aging, insulin resistance, obesity. Symptoms include frequent urination, fatigue, and excessive thirst.

Plant-Based Treatment

Management includes dietary control, exercise, and oral medications. Flaxseed (also known as linseed) contains numerous bioactive components that contribute to its health benefits. The primary mechanisms by which flaxseed exerts its effects are: Rich Source of Alpha-Linolenic Acid (ALA) – Omega-3 Fatty Acid. ALA is partially converted in the body to EPA and DHA, the active omega-3 fatty acids. It provides anti-inflammatory

properties, cardiovascular protection, and an improved lipid profile.

Lignans are phytoestrogens (plant estrogens) with antioxidant properties that can modulate estrogen metabolism. They may reduce the risk of hormone-related cancers (such as breast and prostate cancer) and provide antioxidant and anti-inflammatory benefits.

Dietary Fiber

Fiber enhances bowel regularity, slows glucose absorption, and binds bile acids, which can lower cholesterol. They improve digestive health, lowers blood sugar and cholesterol levels, and aids in satiety and weight management. ALA and lignans, flaxseed helps reduce oxidative stress and inflammation, both of which are underlying factors in many chronic diseases. Lignans can bind to estrogen receptors and modulate estrogen activity, potentially balancing hormones in both men and women. Flaxseed has been utilized for centuries as a dietary supplement, valued for its high fiber and oil content. Numerous studies and clinical trials have investigated the benefits of flaxseed in managing metabolic disorders, particularly type 2 diabetes mellitus (T2DM). Research has concentrated on its potential to lower fasting blood glucose (FBG), HbA1c levels, insulin resistance, and improve lipid profiles. Key bioactive compounds studied include alpha-linolenic acid (ALA), lignans (especially SDG), and dietary fiber. The recommended dosage in clinical trials is 300–600 mg per day, available in capsule or powder form.

Dietary Supplements for Type 2 Diabetes Mellitus

Magnesium: Low magnesium levels are linked to an increased risk of type 2 diabetes. Supplementation may enhance insulin sensitivity and metabolic control in some individuals.

Omega-3 Fatty Acids: Some studies indicate that omega-3 fatty acids may positively influence blood sugar control, although further research is necessary.

Vitamin D: Vitamin D deficiency is associated with a higher risk of type 2 diabetes. Supplementation may improve insulin sensitivity and lower diabetes risk.

Zinc: Preliminary studies suggest that zinc supplementation may positively affect blood sugar control, but additional research is warranted.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Smoking is frequently linked to the progressive respiratory illness known as chronic obstructive pulmonary disease (COPD). Boswellia is suggested for its anti-inflammatory and leukotriene-inhibiting qualities. Chronic inflammation brought on by extended exposure to dangerous particles or gases, mostly from cigarette smoke, is the hallmark of

COPD, which is defined by structural lung alterations. Reduced lung recoil and airway constriction are the results of this persistent inflammation. The severity of the symptoms, which can range from asymptomatic to respiratory failure, can include cough, dyspnea, and sputum production [32–35].

"Chronic Obstructive Pulmonary Disease (COPD) results from prolonged exposure to harmful particles or gases. The most prevalent cause of COPD globally is cigarette smoking. Other contributing factors include secondhand smoke, environmental and occupational exposures, and alpha-1 antitrypsin deficiency (AATD)".

Epidemiology

COPD primarily affects smokers and individuals over the age of 40. Its prevalence increases with age, making it the third most common cause of morbidity and mortality worldwide. In 2015, approximately 174 million people were diagnosed with COPD, leading to around 3.2 million deaths globally. However, this prevalence may be underestimated due to underdiagnosis of the condition.

Pathophysiology

COPD is characterized by inflammation affecting the airways, lung parenchyma, and pulmonary vasculature. This inflammatory process is believed to involve oxidative stress and imbalances between proteases and antiproteases. Emphysema, a key structural change in COPD, involves the destruction of the alveolar air sacs, which are critical for gas exchange. In the presence of irritants such as smoking, an inflammatory response is triggered, recruiting neutrophils and macrophages that release various inflammatory mediators. This leads to the production of oxidants and excess proteases, causing damage to the air sacs. The protease-mediated destruction of elastin results in a loss of elastic recoil, leading to airway collapse during exhalation [36].

Plant-Based Treatment

Short-acting (S) or long-acting (L) beta-agonists (BA) or muscarinic antagonists (MA) and inhaled corticosteroids (ICS).

Boswellia contains boswellic acids, particularly acetyl-11-keto- β -boswellic acid (AKBA), which selectively inhibit the 5-lipoxygenase enzyme. This enzyme is involved in the synthesis of leukotrienes, potent inflammatory mediators in the lungs. In COPD, leukotrienes contribute to bronchoconstriction, mucus production, and chronic inflammation. By inhibiting 5-LOX, Boswellia reduces leukotriene levels, thereby alleviating airway inflammation and bronchospasm. Boswellic acids can inhibit NF- κ B, a transcription factor that promotes the production of pro-inflammatory cytokines (such as TNF- α , IL-1 β , and IL-6). In COPD, chronic activation of NF-

κ B leads to persistent lung inflammation. Suppressing NF- κ B reduces this inflammation and may slow disease progression. Boswellia has demonstrated the ability to reduce oxidative stress, a significant contributor to COPD pathology. It neutralizes free radicals in lung tissues, protecting airway cells from further damage. Boswellia modulates the immune response by influencing T-cell activity and suppressing autoimmune and hypersensitivity reactions that may exacerbate COPD.

It is used 300–500 mg, 2 to 3 times per day.

Dietary Supplements Used in COPD

N-Acetyl Cysteine (NAC) is a mucolytic and antioxidant that thins mucus and reduces exacerbations. Its dose is 600–1200 mg/day. Omega-3 Fatty Acids (Fish Oil) exhibits anti-inflammatory properties that may reduce airway inflammation and enhance immune response. Its dose is 1000–2000 mg/day of EPA + DHA. Vitamin D supports immune function and lung health. Deficiency is common in COPD and associated with poorer outcomes. Its dose is 1000–4000 IU/day, depending on blood levels. Vitamins C and E are antioxidants that protect lung tissue from oxidative stress, often found in lung-support formulas.

CONCLUSION

Dietary supplements can significantly aid in managing health conditions and enhancing quality of life in the elderly when used appropriately alongside a balanced diet. They can help address common nutritional deficiencies, support immune function, and assist in managing chronic diseases such as osteoporosis, heart disease, and diabetes. However, healthcare professionals must evaluate the individual needs of elderly patients, considering potential interactions with medications and existing health conditions. Proper monitoring and personalized recommendations are crucial for ensuring the safety and effectiveness of supplements in older adults.

Dietary supplements are especially beneficial for older adults due to physiological changes associated

with aging, including decreased nutrient absorption, altered metabolism, and reduced dietary intake. Common supplements like vitamin D, calcium, omega-3 fatty acids, and B vitamins can help remedy deficiencies prevalent in geriatric populations and related to conditions like osteoporosis, cognitive decline, and cardiovascular disease.

For instance, vitamin D and calcium supplements are vital for maintaining bone health, while omega-3 fatty acids may lower the risk of cardiovascular issues. B vitamins, particularly B12, are essential for cognitive function and preventing anemia, which is common among older adults.

However, the use of dietary supplements in geriatrics must be carefully managed. Many older adults take multiple medications, increasing the risk of interactions between drugs and supplements. Additionally, self-prescribing or using supplements indiscriminately without medical guidance can result in adverse effects, such as toxicity or interference with other treatments. Therefore, individualized care plans created by healthcare providers, considering the patient's medical history, current medications, and overall nutritional requirements, are essential.

In summary, while dietary supplements can support health and help manage or prevent chronic diseases in the elderly, they should complement—not replace—a balanced diet and regular medical care. Providing proper education on safe supplement use and ongoing monitoring is vital for maximizing benefits and minimizing potential risks.

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