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Editorial

Nutritional supplements in diabetes

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The paper will discuss about the increasing trend of people living with diabetes(PLD) turning to complementary and alternative therapies(CAM), including dietary supplements, to manage their condition.

1. Complementary Medicine

Complementary medicine is used alongside conventional medicine. It complements traditional medical treatments. Examples of complementary therapies include acupuncture, massage, and dietary supplements. In the United States, 38% of adults and 12% of children use some form of complementary medicine. People with diabetes are approximately 1.6 times more likely to use CAM therapies than those without diabetes.

2. Alternative Medicine

Alternative medicine is used in place of conventional medicine. It replaces traditional medical treatments. Examples of alternative therapies include herbal remedies, energy healing, and meditation. Alternative medicine is not typically combined with standard medical treatments.

It emphasizes the importance for HCP's to be aware & knowledgeable about these supplements, their mechanisms of action, and potential side effects.Dietary supplements are important aspect of oral CAM therapy. The Dietary Supplement Health and Education Act(DSHEA) of 1994 defines a dietary supplement as a "product taken by mouth that contains a dietary ingredient intended to supplement the diet." The dietary supplements are consisting of "vitamins, minerals, herbs, amino acids, and other botanicals substances as enzymes and metabolites." Dietary supplements are available as tablets, capsules, soft gels, liquids, powders, and bars which is not considered to be drugs. They come under the category of "foods" and must be labelled as dietary supplements. Both the HCP's & Patients should be aware that because of DSHEA, supplements are not subject to the same Food and Drug Administration(FDA) regulatory standards as drugs. The FDA cannot remove a supplement from the market unless it is proven that the supplement is unsafe. FDA recommended supplement manufacturers to use "good manufacturing practices"(GMPs). The guidelines of GMPs tries to ascertain that supplements are produced in an environment that focuses on several quality assurance standards. There are independent laboratories and consumer organizations that reinforce GMPs. Many supplements are used in the treatment of diabetes and its complications.

Eating healthy foods is the best way to ensure your body absorbs these nutrients, as foods contain phytochemicals that are preventive and provide additional health benefits. A balanced diet is healthier and tastier than relying on multivitamins. Awareness is essential as some supplements can affect diabetes medications, causing either low or high blood sugar.

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3. Rise of Preventative Healthcare

The raise of preventive healthcare is evident since the pandemic leading to proving the nutraceuticals sector as a strong economic area for industrialist. The global market for nutraceuticals is huge at approximately USD 117 billion, the Indian nutraceutical industry can step up to combat health issues in India amidst ongoing pandemic and significantly contribute to India's Gross Domestic Product(GDP).

4. Global Nutraceutical Market Stats

The global market should reach USD 336 billion by 2023 from USD 247 billion in 2019 at a compound annual growth rate(CAGR) of 8%.

5. Indian Nutraceutical Market Stats

In 2017, the Indian market held only a 2% market share of the global nutraceutical market and its estimated valuation stands at around $5 billion as of 2019. It is expected to reach USD 11 billion by 2023, increasing at a CAGR of 21%.

Currently, the Indian market imports more than it export; USD 1.5 billion in exports and importing the USD 2.7 billion worth of nutraceuticals. The Indian nutraceuticals industry has been growing at 25% annually during the pandemic. The Foreign Direct Investment(FDI) has also increased from USD 131.4 million(FY12) to USD 584.7 million (FY19).

6. Measure to Attract Investors & Entrepreneurs

The Food Safety and Standards Authority of India(FSSAI) is about to establish regulations for nutraceuticals in India in line with international standards to attract new entrepreneurs to the nutraceutical field.

A few supplements like alpha lipoic acid, bitter melon, chromium, cinnamon and fenugreek will be discussed. For instance, alpha lipoic acid is highlighted for its antioxidant properties and potential benefits in treating peripheral neuropathy. Bitter melon is noted for its glucose-lowering effects, while chromium is described as aiding in glucose metabolism. Cinnamon is explored for its impact on blood glucose levels, and fenugreek is mentioned for its potential to lower blood glucose and cholesterol.

Supplements such as nicotinamide and omega-3 polyunsaturated fatty acid help in the prevention of T1DM, while T2DM can be prevented with the help of chromium, magnesium, vitamin D, fenugreek and curcumin.

Nicotinamide might help prevent β-cell NAD depletion in those at high risk for T1DM, but it has not proven effective in humans for prevention, though it could benefit recent onset cases.[1] Omega-3 improves insulin sensitivity by enhancing adiponectin and leptin, and their anti-inflammatory properties may prevent insulin resistance and reduce β-cell autoimmunity risk in children at risk for T1DM, as shown in the DAISY study.[2,3]

Chromium may enhance insulin action but has not shown significant effectiveness in preventing T2DM. Low magnesium levels increase the risk of metabolic syndrome and can reduce insulin sensitivity. Safe doses of magnesium are below 350 mg/day, though higher doses may cause diarrhea. Low vitamin D levels are linked to insulin resistance, with benefits seen at doses above 800 IU, but excessive intake can cause toxicity.[4] Fenugreek improves insulin sensitivity and glucose management, showing promise in pre-diabetic patients, but can cause digestive issues.[5] Turmeric may improve β-cell function in T2DM, but its active component, curcumin, has limited availability.[6]

Alpha Lipoic Acid(ALA) as a dietary supplement commonly used in the treatment of diabetes and its complications. ALA is an antioxidant that helps the body convert food into energy. ALA can be found in foods like liver, spinach, broccoli, Brussels sprouts, peas, potatoes, and yeast. ALA is typically given in doses of 600–1,200 mg/day in tablet form. Rare side effects may include hypoglycemia(especially when taken with insulin), rash, thiamine deficiency in at-risk individuals, and possible interactions with thyroid treatments.

The potential side effects of excess chromium intake are renal and liver failure, thrombocytopenia, haemolysis, skin reactions and mood disturbance. Chromium may interact with various medications, including antacids, H2 blockers, corticosteroids, and others, potentially impacting their effectiveness or causing adverse reactions. Individuals taking insulin or insulin secretagogues along with chromium may have an increased risk of hypoglycemia, a condition characterized by low blood sugar levels. These potential side effects highlight the importance of monitoring chromium intake levels and consulting healthcare providers before starting chromium supplementation, especially for individuals with diabetes or other underlying health conditions.

The potential side effects of fenugreek are gastrointestinal distress such as gas, bloating, and diarrhea. Pregnant women should avoid fenugreek due to the risk of uterine contractions.

7. Conclusion

The chronic state of any diseases mainly all NCD's demands in few restrictions in diet which paved the way for dietary supplements as CAM therapies. Dietary supplements can cause adverse effects, drug interactions and contamination, so it is crucial for patients to inform their doctors and pharmacists about all medications they take. While some supplements show promise in preventing diabetes, the most effective approach for preventing T2DM still remains a healthy diet and regular physical activity.

8. Source of Funding

None.

9. Conflict of Interest

None.

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