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Comprehensive Review On Uses And Side Effects Of Supplements

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Abstract:

Dietary supplements are products such as vitamins, minerals, and herbs that claim to promote wellness. Many of these supplements do have known benefits, but there are also risks you should know about. These are products designed to augment your daily intake of nutrients, including vitamins and minerals. Many are safe and offer significant health benefits, but there are some that pose health risks, especially if overused. In this review it's showing that various types of food supplements, like multi vitamins (vitamin A, B, C, D, E, K and B-complex vitamins), Calorie supplement, Protein supplement, Herbal supplement, Mineral supplement, Essential fatty acids, Bodybuilding supplements, Omega 3 Supplements. Their Advantages and Disadvantages. FDA regulatory history of food supplement.

Keywords: Supplements, FDA, Whey protein, stomach pains, dehydration

Introduction:

Some dietary supplements may help improve your overall health and reduce your risk of some health conditions. Healthcare professionals often recommend dietary supplements for people who have certain health conditions, are at risk of certain conditions, or have a lack of nutrients in their diets. But that doesn't mean it's always safe to take dietary supplements. They can have side effects and risks, including organ and nerve damage.

Dietary supplements are products that are ingested in addition to the regular diet in order to provide additional health-promoting nutrients. In the US, dietary supplements are defined and regulated according to the Dietary Supplement Health and Education Act (DSHEA) of 1994 [1]. According to the DSHEA, a dietary supplement is a product that is intended to supplement the diet, contains dietary ingredients including vitamins, minerals, amino acids, herbs and botanicals, is intended to be ingested as a pill, capsule, tablet, or

liquid, and is labeled as being a dietary supplement [2]. Food items that are fortified with nutrients such as vitamins and minerals to ensure proper nutrient levels are not considered dietary supplements. The term "nutraceutical" is not defined by U.S. law, but is generally understood to be a purified product derived from a human food source, which is purported to provide extra health benefits beyond the basic nutritional value found in foods. The most cited reasons for taking the supplements were to improve overall health, maintain health, and, especially among women, for bone health. The most commonly used supplements were multivitamin/mineral supplements, calcium supplements, and omega-3/fish oil [3]. Lack of vitamins will certainly cause deficiency diseases such as scurvy, beriberi, pellagra, and rickets. However, the vitamin content of normal well-balanced diets is sufficient to avoid these diseases. Studies aimed at determining effects of supplements often given conflicting results.

The intake of dietary supplements is generally safe, but not totally without risk. The current review is not intended to be comprehensive report of all known adverse effect for all dietary supplements. Instead, we have selected to discuss adverse events for the most commonly used supplements such as vitamins, minerals, omega-3/fish oil, soy protein, and plant-derived antioxidant and anti-inflammatory nutraceuticals. We also discuss weight-loss and body building supplements, and various botanical supplements which have been associated with more severe adverse effects.

What are dietary supplements?

Dietary supplements include products such as vitamins, herbs, minerals, enzymes, amino acids, and botanicals. They are available over the counter. Vitamins C and D, fish oil, echinacea, melatonin, calcium, iron, and probiotics are examples of common supplements.

Most come in multiple forms, such as:

- tablets
- capsules
- gummies
- teas
- powders
- candies
- energy drinks
- nutrition bars

What are the benefits of dietary supplements?

Dietary supplements can be a great source of nutrients. They can help improve your overall health and may reduce your risk of some health conditions.

Sometimes, a healthcare professional might recommend that you take a dietary supplement. For instance, they might advise that you take an iron supplement if you have iron deficiency anemia or take calcium if you a have risk of osteoporosis.

A healthcare professional might recommend a dietary supplement if you:

- have a high risk of a health condition that can be lowered with the addition of a nutrient
- need extra nutrients because you're pregnant or nursing
- have a condition such as kidney failure that makes it difficult for your body to absorb nutrients
- have a specialized or restricted diet that lacks a specific nutrient
- experience malnutrition and don't get enough nutrients from your diet
- receive lab results showing a deficiency of a specific nutrient
- are an older adult and have trouble absorbing nutrients from foods

Some dietary supplements have been linked to a decreased risk of some conditions and to improvements in health. For example:

- Folic acid is Source to a lower risk of fatal development issues.
- The omega-3 fatty acids in fish oil are associated with improved heart health.
- Calcium and vitamin D can help slow down bone loss.
- Vitamins A, C, and E are Source to eye health.
- Multiple common herbs, including St. John's wort and rosemary, have antioxidant qualities Source.
- Probiotics are known Source for their ability to support digestion and the immune system.
- Magnesium can promote Source sleep and healthy digestion.

Are there side effects of taking dietary supplements?

Dietary supplements can lead to side effectsTrusted Source. The risk of side effects increases if you take many supplements together or if you take high doses. Since many dietary supplements add to the nutrients you get from foods, it can be easy to take an overly high dose without knowing.

Possible side effects of dietary supplements include:

- nausea
- vomiting
- headache
- constipation
- excessive sleepiness

Vitamin and mineral supplement

By the early 20th century, it had become clear that nutrition consisting solely of carbohydrates, fats, and proteins is insufficient for maintaining health. The term "vitamine" was coined by Casimir Funk in 1912 to describe the micronutrients whose deficiencies cause beriberi, scurvy, and pellagra [4]. As the various vitamins were isolated and synthesized, a market for vitamins quickly developed. Today, multivitamin/multimineral, vitamin and mineral supplements are the most widely utilized dietary supplements by the American population [5].

Fish oil and omega-3 fatty acids:

Omega-3 fatty acids are essential fatty acids that cannot be synthesized *de novo* in humans and therefore must be provided through the diet [6]. A link between fish oil and ischemic heart disease was suggested by a widely-publicized study from 1971 of Eskimos (Greenlanders) from the west coast of Greenland [7]. Greenlanders eating a traditional meat and fish diet that is rich in polyunsaturated omega-3 fatty acids had significantly lower levels of plasma total lipids, plasma cholesterol, plasma triglycerides and pre-β-lipoprotein (= very low-density lipoprotein) than both Danes and Greenlanders living in Denmark. The authors hypothesized that this diet contributed to the low incidence of ischemic heart disease and diabetes among Greenlanders. Since then, polyunsaturated omega-3 fatty acids taken in the form of fish oils, krill oil or mixtures of docosahexaenoic and eicosapentaenoic acids (DHA and EPA) purified from fish oils have become widely utilized dietary supplements. These fatty acids have metabolites with anti-inflammatory properties and have electrical stabilizing effects on ion channels in cardiac myocytes [8-9]. They have been linked to anti-cancer and cardioprotective effects [10-11].

PROTEIN POWDERS AND INFANT FORMULA

Protein powders consisting of the dairy proteins casein, whey and of vegetable proteins in soy protein isolate (SPI) are popular supplements among athletes and body builders. The dairy proteins appear to have little toxicity except in individuals with allergies to cow's milk protein, although excessive consumption may result in ketosis. In contrast, there is an ongoing debate with regard to the potential safety of SPI. This is related primarily to the presence of weakly estrogenic compounds – the isoflavones genistein and daidzein which are among the 100 phytochemicals which remain bound to the protein isolate [12].

NUTRACEUTICALS

Most commonly used nutraceuticals are compounds derived from fruits and vegetables. They are often compounds with anti-oxidant or anti-inflammatory properties which are suggested to provide protection against chronic diseases such as cardiovascular disease, diabetes, cancer and osteoporosis [13]. Widely consumed nutraceuticals include flavonoid plant pigments such as anthocyanins from berries, flavonols from dark chocolate, polyphenols such as resveratrol from red grapes, and catechins from tea and quercetin.

WEIGHT-LOSS, SPORTS, AND BODYBUILDING SUPPLEMENTS

As more and more of the world population becomes overweight and obese, there is a huge market for weight-loss products, including dietary supplements. Among military service members, athletes and bodybuilders it is also common to ingest dietary sports supplements intended to burn fat and increase performance, muscle mass or strength. As examples, 53% of active-duty US Army soldiers report using at least one dietary supplement per week (60), and 64% of college students participating in athletics use dietary supplements to enhance performance [14]. The supplements are often proprietary blends of several supposedly natural ingredients.

What are the possible risks of taking dietary supplements?

Supplements can also have long-term complications and risks such as:

- liver or other organ damage
- reduced bone strength
- fetal development abnormalities
- increased risk of bleeding
- changes in your response to anesthesia
- reduced effectiveness of chemotherapy
- nervous system damage

Additionally, some supplements can interact with prescribed medications.

Some side effects are specific to certain supplements or to the combination of certain supplements and medications. For instance, vitamin K can make the blood-thinning medication warfarin less effective.

That's why it's always important to tell a healthcare professional about any supplements you take.

What's the difference between food supplements and dietary supplements?

Manufacturers and retailers sometimes use the term "food supplements" to label supplements made from specific ingredients that are not made in a lab, are made to be added to foods, or are high in calories.

For instance, some powdered supplements that are meant to be mixed into a food or beverage might be called food supplements. Supplements that provide calories and are meant to replace a meal or part of a meal can also sometimes be called food supplements.

What's the outlook for people who take dietary supplements?

It's important to talk with a healthcare professional about any dietary supplements you take. Although some have been found to improve overall health and lower the risk of certain health conditions, supplements can also come with risks.

The risks and outlook related to taking any supplement depends on the supplement type, the dosage, the reason you're taking it, and factors such as your overall health and any medications you take. A healthcare professional can help you understand the possible risks and benefits of any supplement you're considering.

What foods are high sources of protein?

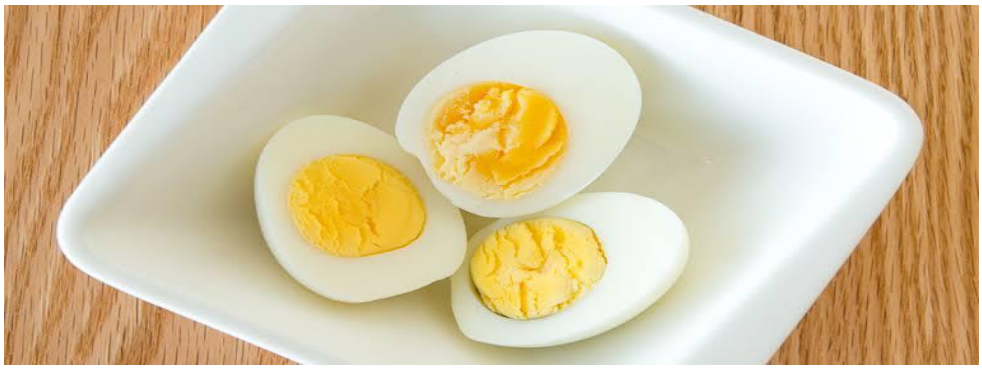
A large variety of plant and animal-based foods are high in protein, including:

Meat

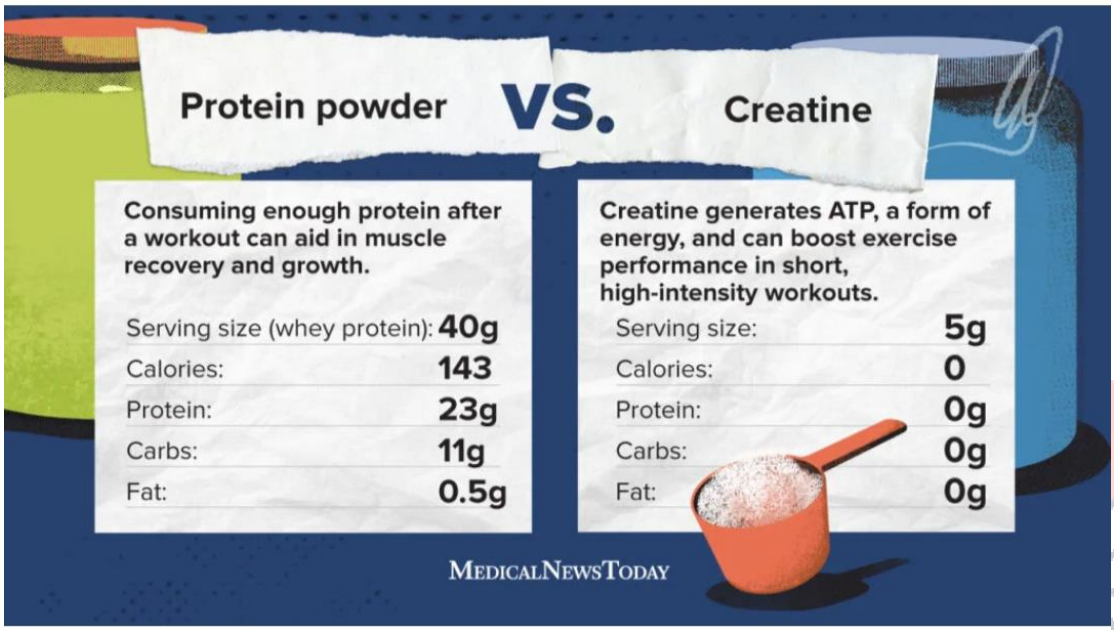
Chicken

Fish

Egg



What are creatine and protein?



Creatine and protein powder are two supplements that people can take for exercise performance and recovery.

What is L-arginine?

L-arginine is an amino acid that helps the body build protein.

Benefits of L-arginine

L-arginine has two effects: it turns into nitric oxide and helps the body build protein. These effects give L-arginine an array of potential benefits, including:

supporting heart health

reducing chest pain

helping build muscles

repairing wounds

improving male fertility

A recent study suggests an avocado a day may improve diet quality, but the effects on cardiometabolic health remain unclear. Anjelika Gretskaia/Getty Images

Poor diet quality has been associated with a higher risk of cardiometabolic disease. A recent study suggests daily avocado consumption may improve overall diet quality, but the effects on cardiometabolic health were unclear. Experts say a varied and balanced diet is the best way to support long-term health and longevity.

Potential Problems

Large doses of certain nutrients can have adverse effects. You can even overdose on certain supplements, risking serious harm and death.[8] Among some of the harmful interactions or dosing concerns:

- Vitamin K can reduce the effectiveness of blood thinners like Coumadin (warfarin).[9]
- Vitamin E can increase the action of blood thinners, leading to easy bruising and nosebleeds.
- St. John's wort can accelerate the breakdown of many drugs, including antidepressants and birth control pills, thereby reducing their effectiveness.
- Vitamin B6 (pyridoxine), when used for a year or more at high doses, can cause severe nerve damage. Vitamin B6 can also reduce the effectiveness of the anti-seizure drug Dilantin (phenytoin) and levodopa (used to treat Parkinson's disease).
- Vitamin A used with retinoid acne medications such as Accutane (isotretinoin) and Soriatane (acitretin) can cause vitamin A toxicity.[9]
- Iron and calcium supplements can reduce the effectiveness of antibiotics, namely tetracyclines and fluoroquinolones, by as much as 40%.
- Vitamin C can cause diarrhea when taken in doses higher than the gut can absorb (but some patients can tolerate 5,000mg to 25,000mg per day).
- Selenium, boron, and iron supplements can be toxic if taken in large amounts.

Conclusions:

The market for nutraceuticals and dietary supplements used to enhance a consumer's health or well-being is huge. They aren't always safe for everyone, though. Supplements containing active components that have pharmacological or physiological effects are likely to have side effects in people who are sensitive, just like real medications do. To prevent major medical consequences, more attention must be paid to side effects and possible combinations. Both doctors and users should review the most recent research before starting or recommending a regimen containing these drugs. It is important for medical professionals to be aware that a significant portion of the general public uses dietary supplements. Thus, in order to give patients the best possible medical care, they should enquire about the supplements they use.

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