

Vitamin D deficiency among Indians

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Vitamin D deficiency is a worldwide widespread health problem, with a range of prevalence in between 70%–100% in the general population. The concern for vitamin D estimation has increased tremendously in India despite the fact of plentiful sun. As per the report of International Osteoporosis Foundation, in North India, 96% of neonates, 91% of healthy school girls, 78% of healthy hospital staff, and 84% of pregnant women were found to have hypo-vitaminosis D. On the other hand, prevalence of vitamin D deficiency in southern India was estimated to be 40% among males and 70% among females. There was also a significant rural urban variation in the vitamin D deficiency status that was attributed to the diversity of occupation which the people were involved in.

It is an essential fat-soluble vitamin for calcium maintenance homeostasis, for bone health and for preventing falls and fractures, and it has also been related to hypertension, diabetes, metabolic syndrome, cancer, autoimmune and infectious diseases, among others. These conditions are major public health problems worldwide. Vitamin D deficiency is affecting high proportion of population, yet it is the most under-diagnosed and under-treated nutritional deficiency in the world. Vitamin D deficiency is widespread in individuals irrespective of their age, gender, race and geography. Vitamin D is photosynthesized in the skin on exposure to UVB rays. Sun exposure alone ought to suffice for vitamin D sufficiency. However, vitamin D deficiency is widely prevalent despite plentiful sunshine even in tropical countries like India. Cultural and social taboos often dictate lifestyle patterns such as clothing-that may limit sun exposure and vegetarianism-which certainly limits vitamin D rich dietary options. Most Indians are vegetarians. The socio-economically backward people constitute a large percentage of the population in India. The underprivileged generally suffer from overall poor nutrition. Vitamin D rich dietary sources are limited and unaffordable to most Indians. Vitamin D supplements are available, but most Indians are not aware that they need additional vitamin D. Additionally; the cost of these supplements is so high that majority of the people were not able to buy it. Fortification of staple foods with vitamin D may prove to be a more viable solution towards attaining vitamin D

sufficiency in India. For starters, Vitamin D is not a simple vitamin. It is a steroid hormone that impacts virtually every cell in the body. It is synthesized in the skin on exposure to sunshine and is needed to absorb calcium and for bone health.

Vitamin D deficiency has a bearing not only on skeletal but also on extraskeletal diseases. Owing to its multifarious implications on health, the epidemic of vitamin D deficiency in India is likely to significantly contribute to the enormous burden on the healthcare system of India. Many of these studies measured serum 25-hydroxyvitamin D levels in ostensibly healthy subjects. Vitamin D is an essential vitamin required by the body for the absorption of calcium, bone development, immune functioning, and alleviation of inflammation. Vitamin D deficiency can lead to rickets, a weakened immune system, increased cancer risk, poor hair growth, and osteomalacia. Excess vitamin D can cause the body to absorb too much calcium, leading to increased risk of heart disease and kidney stones.

Vitamin D is oil soluble, which means you need to eat fat to absorb it. Foods high in vitamin D include mushrooms exposed to sunlight, fish, ham, pork chops, chicken, fortified milk, cheese, fortified soy milk, fortified orange juice, and fortified breakfast cereals. Vitamin D also fights infections, including colds and the flu, as it regulates the expression of genes that influence your immune system to attack and destroy bacteria and viruses.

Optimizing vitamin D levels can help protect against:

– *Cardiovascular disease* : Vitamin D is very important for reducing hypertension, atherosclerotic heart disease, heart attack, and stroke. Studies showed that vitamin D deficiency increased the risk of heart attack by 50 per cent.

– *Autoimmune diseases* : Vitamin D is a potent immune modulator, making it very important for the prevention of autoimmune diseases, like multiple sclerosis and inflammatory bowel disease.

– *Infections, including influenza* : It also helps you fight infections of all kinds. A study done in Japan, for example, showed that schoolchildren taking 1,200 units of vitamin D per day during winter reduced their risk of getting influenza A infection by about 40 per cent. It's far more prudent, safer, less expensive, and most importantly,

far more effective to optimize your vitamin D levels than to get vaccinated against the flu.

- *DNA repair and metabolic processes:* Healthy volunteers taking 2,000 IUs of vitamin D per day for a few months up-regulated 291 different genes that control upto 80 different metabolic processes, from improving DNA repair to having effect on autoxidation (oxidation that occurs in the presence of oxygen and/or UV radiation, which has implications for aging and cancer, for example), boosting immune system and many other biological processes.

How much vitamin D do you need for optimal health?:

When it comes to vitamin D, everyone don't want to be in the "average" or "normal" range, they want to be in the "optimal" range. The reason for this is that as the years have gone by, researchers have progressively moved that range upward. At present, based on the evaluation of healthy populations that get plenty of natural sun exposure, the optimal range for general health appears to be somewhere between 50 and 70 mg/ml.

Symptoms in children :

- Children with severe deficiency may have soft skull or leg bones. Their legs may look curved (bow-legged). They may also complain of bone pains, often in the legs, and muscle pains or muscle weakness. This condition is known as rickets.

- *Poor growth:* Height is usually affected more than weight. Affected children might be reluctant to start walking.

- *Tooth delay:* Children with vitamin D deficiency may be late teething, as the development of the milk teeth has been affected.

- Irritability in children can be due to vitamin D deficiency.

- Children with vitamin D deficiency are more prone to infections. Breathing symptoms can occur in severe cases. Breathing can be affected because of weak chest muscles and a soft rib cage.

- When rickets is very severe, it can cause low levels of calcium in the blood. This can lead to muscle cramps, fits and breathing difficulties. These need urgent hospital treatment.

- Rarely, an extremely low vitamin D level can cause weakness of the heart muscle (cardiomyopathy).

Symptoms in adults :

- Some people complain of a general tiredness, vague aches and pains and a general sense of not being well.

- In more severe deficiency (known as

osteomalacia), there may be more severe pain and also weakness. Muscle weakness may cause difficulty in climbing stairs or getting up from the floor or a low chair, or can lead to the person walking with a waddling pattern.

- Bones can feel painful to moderate pressure (often more noticeable in the ribs or shin bones). Not uncommonly, people have a hairline fracture in the bone which is causing tenderness and pain. Bone pain often also occurs in the lower back, hips, pelvis, thighs and feet.

Vitamin D and sunlight : It is important to expose 18% of the body, that is bare arms and bare face; bare means without sunscreen or protection with clothes. In summers, it is ideal to stay exposed to sunlight for 30 minutes.

Supplements: Some people are more at risk of vitamin D deficiency and so are recommended to take vitamin D supplements of 10 micrograms (400 International Units) routinely. These include all pregnant and breast-feeding women, all babies and young children aged 6 months to 5 years, people aged 65 years and over, and people who are not exposed to much sun. In addition, a doctor may advise routine vitamin D supplements for people with certain gut (bowel), kidney or liver diseases, for people prescribed certain medicines and for certain people with darker skin.

Foods: Very few foods naturally contain vitamin D. Fatty fish, like swordfish, salmon and tuna provide 556, 447 and 154 international units, respectively, in a 3-ounce serving. Egg yolk contains vitamin D, and eating one egg provides 41 international units. Because the liver stores vitamin D, eating 3 ounces of beef liver provides 42 international units. Milk fat, found in whole milk but absent from skim milk, naturally contains trace amounts of vitamin D depending on the producing animal's food intake and sun exposure. The best way to get more calcium is from diet. Vegetables and fruits like broccoli, avocado, kiwi and papaya and cereals like all your whole wheat grains including *Ragi*, barley and soy bean *Atta* and dry fruits like walnut and peanuts also help in overcoming a Vitamin D deficiency. Probably already know that dairy products - such as milk, cheese, and yogurt - provide calcium. Other foods that are high in calcium include: Spinach, Kale, Okra, Collards, Soybeans, White beans, Some fish, like sardines, salmon, perch, and rainbow trout, Foods that are calcium-fortified, such as some orange juice, oatmeal, and breakfast cereal.

Foods that provide vitamin D include Fatty fish, like tuna, mackerel, and salmon, Foods fortified with vitamin D, like some dairy products, orange juice, soy milk, and cereals, Cheese, Egg yolks.

Conclusion: Vitamin D may also play a role in muscle

function and the immune system. The immune system is your body's defense system. Vitamin D is produced when skin is exposed to sunshine. It can be found in small amounts in a few foods, including fatty fish such as herring, mackerel, sardines and tuna. To make vitamin D more

available, it is added to dairy products, juices, and cereals that are then said to be "fortified with vitamin D." But most vitamin D - 80% to 90% of what the body gets - is obtained through exposure to sunlight.

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