



HSIS
Vitamin D – HSIS REAFFIRMS THE NEED FOR THIS NUTRIENT
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Vitamin D is widely associated with sunlight and many of us are aware that we need sufficient Vitamin D to maintain healthy bones and teeth. But what exactly is Vitamin D and what roles does it play in our bodies?

Introduction

Vitamin D is one of 13 vitamins. It is fat soluble, which means that it is absorbed, together with fat from the intestine, into the circulation. Once absorbed into the circulation vitamin D is carried to the liver where it is stored. Any disease or disorder that affects the absorption of fat, such as coeliac disease (a condition affecting the small intestine), could lead to a deficiency of fat soluble vitamins, including vitamin D.

Vitamin D is one of the few vitamins that is made by our bodies – in this case the action of sunlight on the skin. It is the ultraviolet rays in sunshine that are important for this action.

Vitamins serve crucial functions in all body systems, including immune, hormonal, circulatory, digestive, musculo-skeletal and nervous systems. Vitamin D is crucial for maintaining strong, healthy bones and teeth as it promotes calcium absorption and bone mineralisation. Without vitamin D, bones can become brittle, thin or misshapen. Deficiency can lead to rickets in children and osteomalacia in adults - skeletal diseases that weaken bones.

Where people may be deficient in vitamin D they need to get it from food or supplements. Vitamin D is found in salmon, tuna and other oily fish and may be added to milk and fortified foods, but diet alone cannot provide all the vitamin D that is needed.

Vitamin D, cancer and MS

Evidence supporting a link between low vitamin D status and increased risk of cancer comes from epidemiological^{1,2} and animal studies³. Other research suggests that vitamin D could protect against multiple sclerosis, with data showing that those with the highest levels of the vitamin (particularly before the age of 20) having a two-thirds lower risk of developing MS compared to those with the lowest levels.

When supplementation can make a difference

Surveys show that many people fail to reach their intake targets for all vitamins and minerals from their diet, putting their health at risk. There is plenty of evidence of the unhealthy eating patterns which are associated with low micronutrient intake. For example, the Health Supplements⁴ Information Service (HSIS) survey showed that intake of fresh fruit and vegetables is far less than is recommended for health: three out of four young mothers say they never make an evening meal from scratch. This is in stark contrast with previous generations, with 87% of modern mothers saying their mothers used to make an evening meal from scratch at least five times a week. In the same survey, 57% of respondents do not serve fresh vegetables with the evening meal at least four times a week and nearly half of mums do not include fruit in their children's packed lunch.

¹ Holick MF 2006. Vitamin D: its role in cancer prevention and treatment. *Prog Biophys Mol Biol.* 92:49-59.

² Cui Y & Rohan TE 2006. Vitamin D, calcium, and breast cancer risk: a review. *Cancer Epidemiol Biomarkers Prev* 15:1427-37.

³ Johnson CS et al. 2006. The antitumor efficacy of calcitriol: preclinical studies. *Anticancer Res* 26:2543-9

⁴ Data on file; December 2006

These findings are in line with national surveys. A survey commissioned by the UK's Department of Health on the diet of adults show that more than a decade after the first National Diet and Nutrition Survey (NDNS), the same dietary patterns have continued with no evidence of significant improvement. It is clear that many groups of people have low intakes of nutrients with respect to their requirements. Groups with particularly low nutrient intakes on account of poor dietary choice include younger people aged 19 to 24 and poorer households. This trend in unhealthy eating is consistent throughout the western world. Low nutrient intake among the general population is what prompted eminent scientists, reviewing the effect of nutrient intake on risk of chronic disease, to publish the statement in the prestigious *Journal of the American Medical Association (JAMA)* that "because low vitamin intake has been linked to a host of illnesses, everybody, regardless of age or health status, should take a daily multivitamin."⁵

Dietary surveys show that a large numbers of people in Northern climates, including Britain, have blood levels of vitamin D which are too low. Diet does not provide enough vitamin D and the need for each of us to expose our skin to sunlight for short periods of time to make it, runs contrary to advice to avoid sunbathing to the reduce risk of skin cancer⁶. Confusing messages, combined with seasonal variation in the strength of UV radiation, geographic latitude, time of day, cloud cover and use of sunscreen, merge to hamper reliable vitamin D synthesis⁷.

Apart from its well-established role in enhancing bone, studies in recent years have linked low vitamin D to increased risk of a range of chronic diseases, including cancer and diabetes.

While it has been known for years that vitamin D interacts with receptors in the intestine and bone to regulate calcium metabolism, it came as a surprise to scientists to discover that the vitamin D receptor is also present in most tissues and cells in the body and the nutrient is able to exert a much wider range of physiological effects than was previously thought, including modulation of the immune system, elements of which have cancer-protective effects⁸.

Who is at risk?

- Elderly people are at risk of vitamin D deficiency if they don't get much sun because they are housebound or covered up for most of the year. As a result, if such deficiency happens, there could be serious consequences to this age group's bone health. All older people can benefit from a multivitamin supplement containing vitamin D. UK National Guidelines recommend supplementary intake of calcium and vitamin D in older people at risk of osteoporosis.
- Only animal foods and specially fortified foods contain vitamin D in significant amounts. Hence, vegetarians, and especially vegans, are at risk of vitamin D deficiency and this group could also be at risk of deficiencies of other vitamins and minerals. As a result, most vegans and vegetarians would benefit from a multivitamin/mineral supplement.
- People who are chronically ill may also be at risk of vitamin D deficiency if they don't get much sun and are not able to eat a healthy diet because they lack appetite, feel poorly, are suffering from sore mouths and/or other pain, and may be unable to shop and cook properly.
- The National Diet and Nutrition Survey shows that many children fail to reach their dietary targets for vitamins and minerals. To tackle this head-on, the Department of Health

⁵ Fletcher RH & Fairfield KM 2002. Vitamins for chronic disease prevention in adults: clinical applications. *JAMA* 287:3127-9.

⁶ Hiom S 2006. Public awareness regarding UV risks and vitamin D--the challenges for UK skin cancer prevention campaigns. *Prog Biophys Mol Biol* 92:161-6.

⁷ Holick MF. Vitamin D: the underappreciated D-lightful hormone that is important for skeletal and cellular health. *Curr Opin Endocrinol Diabetes* 2002;9:87-98.

⁸ Yee YK et al 2005. Vitamin D receptor modulators for inflammation and cancer. *Mini Rev Med Chem* 5:761-78.

recommends that all children aged six months to five years old take a supplement containing vitamins A and D. However, the survey also showed that levels of vitamin D and several other vitamins and minerals were also of concern for older children: but for this group no government-backed recommendation has been made.

- Pregnant women would benefit from vitamin D (10 micrograms daily), particularly if their skin is not exposed to much sun.
- Anyone whose skin is routinely covered for religious or cultural reasons may be at risk of vitamin D deficiency.
- In the UK Asian people may be prone to vitamin D deficiency, with Asian children and pregnant women are particularly at risk⁹.
- Finally, anyone living a busy, stressful life who relies on “fast food” and does not make time to shop, cook and eat properly is likely to be lacking in certain minerals and vitamins.

Safety levels

The Safe Upper Limit (SUL) for vitamin D is 25 micrograms and the Recommended Daily Amount (RDA) is 5 micrograms. Multivitamins usually contain 5 or 10 micrograms in a daily dose.

It is safe to give children a daily multivitamin supplement, although it is a good idea to check with their GP before doing so. The Department of Health recommends that children aged between six months and four years take vitamin A, C and D supplements.

Recommended daily doses vary, depending on a number of factors including age, weight and overall health status. The general recommendations are ¹⁰:

- children under six: use one-quarter of adult dosage
- children aged six to 12: use half adult dosage
- children and teens aged 12 to 17: use three-quarters the adult dosage

⁹ Alfaham M, et al. 1995 Vitamin D deficiency: a concern in pregnant Asian women
Br J Nutr. 73:881-7.

¹⁰ Ref: Bandolier's summary of advice for healthy living