

In the dark about vitamin D?



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If you think you can't be vitamin D deficient in sunny South Africa, think again. Statistics from other sunny parts of the world tell a very different story e.g. Australia: 40% of the population are vitamin D deficient; Dubai has a 90% deficiency rate. When one considers the importance of vitamin D for body health, ignoring it can lead to dire consequences.^{1,2,3,6}

What part does vitamin D play in health?

Vitamin D is one of the most powerful hormones in the body. Not only does it regulate calcium (necessary for bones and teeth) but it has a profound effect on the immune system. Medical research over the past decade has linked many disease conditions to vitamin D insufficiency e.g. heart disease, hypertension, type 1 and 2 diabetes, auto-immune diseases and certain cancers. Even the colds and 'flu of the winter have been linked to vitamin D insufficiency.¹

Vitamin D's role in oral health

Recent research, especially by Dr Robert Schroth in Canada,³ has linked vitamin D deficiency in pregnancy to enamel hypoplasia (**figure 1**) of the offspring, a risk factor for tooth decay. When one considers that the teeth, including the permanent ones, start developing in utero, the need to ensure our pregnant and lactating moms have optimal vitamin D status should be the aim of all health professionals in the perinatal arena. Two recent studies^{4,5} from the US have highlighted vitamin D deficiency: one study showed 76% of mothers giving birth and 81% of their newborns were deficient (< 20ng/mL).⁴

Know your status

The only way to detect sufficiency is by a simple blood test. It's called a serum assay of 25(OH)D. Results below 20 ng/mL are 'deficient'. (At this level, babies and infants can present with rickets; in adults it's osteomalacia, a generalised painful bone disease with muscle weakness.) 35-40ng/mL is considered sufficient but many experts consider 50-100ng/mL the optimal concentration for protecting against cancer and heart disease.²

Factors affecting vitamin D status:

- Skin pigmentation and ethnicity
- Season and latitude and pollution
- Clothing and use of sun screen

- Obesity
- Age
- Strict vegetarian diet
- Prolonged breast feeding without supplements
- Children with gastroenterological, neonatal and neurological disability

How is vitamin D produced in the body?

Ultraviolet-B radiation from sunlight acts on a precursor to cholesterol in the skin. This is converted in the liver and in the kidneys to the active form of vitamin D (1,25 (OH) D) which switches on genes in every cell of the body. Some cells, e.g. macrophages, can activate vitamin D directly which is important for local immunity. If vitamin D is insufficient, genes are not 'switched on' and disease can result. So far over 1,000 genes have been identified to be switched on by vitamin D. Over 200 of these genes regulate the heart and blood vessels.



Figure 1. Enamel hypoplasia

Where does one get vitamin D?

There are only two sources: sunlight or supplements. Food sources are insignificant for practical purposes. Sensible sun exposure is the ideal way, but most of us avoid the sun or don't know how to use it safely. For fair-skinned individuals, 10-15 minutes of direct full sunlight (between 10 am and 3 pm) will expose $\geq 40\%$ body without sunscreen. Pigmented skins require 1 hour to achieve the same effect.

For most of us who never see the light of day due to work/lifestyle, supplements are necessary to maintain optimum levels. (Many use a multivitamin but these usually have only 400IU of vitamin D which is inadequate).

Guideline table of suggested supplements:		
Age range	Adequate intake (IU/day)	Safe Upper Limit (IU/day)
0 - 1 year old	400 - 1000	2000
1 - 12 years old	1000 - 2000	5000
13+ years old	1500 - 2000	10 000
Obese individuals	2 - 3 times above values	
Pregnant women	1400 - 2000	10 000
Nursing mothers *	2000 - 4000	10 000
* Nursing Mothers who want to ensure that their baby is getting enough vitamin D from their breast milk should take 4,000 – 6,000 IU/day. ⁶		

Why are so many of us vitamin D deficient?

Sun exposure, particularly from ultraviolet-A radiation, might lead to premature skin aging and skin cancers. Sun tanning is not advocated. Instead, sensible sun exposure which provides the benefits of vitamin D for body health without harmful effects of over-exposure are recommended. The interesting find is that malignant melanomas, which is why we dread the sun, occur in the least sun-exposed parts of the body.

Most of us are exposed to sunlight through glass e.g. windows, but glass filters out UV-B radiation i.e. no vitamin D synthesis. Sunscreen acts in the same way. An SPF of 30 reduces exposure to the skin by 99% i.e. no vitamin D synthesis. If we do venture out into the sunlight, it's usually in the early morning or late afternoon when UV-B radiation is too low to produce adequate vitamin D.

Years ago, children used to receive cod liver oil supplements but, unfortunately, has gone out of favour due to its pungent taste. Although high in vitamin D, cod liver oil is high in vitamin A so it's not recommended for vitamin D supplementation, especially during pregnancy.

Who is at risk for vitamin D deficiency?

We are all vitamin D deficient, especially those with dark skins and those who avoid sun exposure. Pregnant and lactating moms and children under 5 are at highest risk, as are people over 65 years. We should all be cognisant of our vitamin D status from the cradle to the grave. Don't be left in the dark when it comes to vitamin D!

What to do

- Check vitamin D status with GP/ gynaecologist.
- Practice sensible sun-exposure.
- Supplement, especially pregnant and lactating moms.
- Check with GP/Paediatrician for babies and toddlers.

References

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