



## Vitamin D and Pregnancy



**Vitamin D is important for good bone health throughout a woman's life. It is also important for bone development in the unborn child and throughout childhood.**

### What is the result of vitamin D deficiency?

In adults, vitamin D is required to continually replenish the calcium in bones. Vitamin D deficiency results in leaching of calcium from the bones which leads to **osteopaenia** (low bone density) and eventually **osteoporosis** (pathologically low bone density). This leads to fractures at the wrists, hips and spine. The hunched-over little old lady is a good example of multiple crush fractures of the spine.

Children's bones tend to be quite flexible but become harder after puberty. Vitamin D deficiency in children does not usually cause fractures. Instead, the bones tend to deform. The conditions caused are **osteomalacia** and **rickets**. These result in irreversible bone deformities. Deformities have been seen as early as the time of birth.

### What are the sources of Vitamin D?

#### 1. Sunlight

Sunlight provides over 90% of the vitamin D in humans. Vitamin D is created in the deeper layers of our skin and requires ultraviolet B (UVB) rays from the sun. An average adult requires 20 minutes of sunlight three times a week on the face, upper limbs and upper chest. Over time, sun exposure to the deeper layers of the skin will cause damage that can lead to aging effects and skin cancers. Sun exposure varies greatly due to skin colour, clothing, sunscreen, cloud cover, season of the year, the latitude, air pollution and the amount of ozone in the atmosphere.

#### 2. Dietary sources

Few foods naturally contain vitamin D (e.g. some fish). Breast milk has many benefits but is a poor source of vitamin D. Infant formula is fortified with vitamin D.

### What are normal levels of vitamin D?

The main form of vitamin D circulating in our bodies is 25-hydroxyvitamin D. For optimal bone health, blood levels should be  $\geq 50$  nmol/L. Optimal levels of vitamin D in pregnancy are not known. The fetus derives its vitamin D through passage across the placenta. When vitamin D is measured in umbilical cord blood, the level is 65% that of the maternal blood. Therefore, for the fetus to have a vitamin D level  $\geq 50$  nmol/L, the maternal vitamin D level should be  $\geq 80$  nmol/L. In Australia, low levels of vitamin D are found in 26-48% of women. In Queensland this rate is 10%.

### What are the effects of vitamin D deficiency?

Vitamin D deficiency is often asymptomatic. Some early symptoms may include tiredness, bone pain and muscle pain. In women, there is a link between low vitamin D levels and breast cancer. In children with severe forms of vitamin D deficiency, rickets may occur. This is due to failure of calcium to incorporate at the growth plates of bones. The result is deformities at the growth plates. Other features include low calcium levels and seizures.

### How is vitamin D deficiency diagnosed and treated?

Maternal vitamin D levels are now checked via a blood test at the first antenatal visit. Vitamin D supplementation is started if the level is  $< 80$  nmol/L. The dose required depends on the severity of the deficiency. Levels may be checked again in the second and third trimester of pregnancy.

Extra sun exposure is not a recommended treatment as it will increase the risk of skin damage and skin cancer. Oral vitamin D supplements come in many forms such as tablets (usually large and hard to swallow), caplets (easier to swallow) and liquid drops. Liquid drops are absorbed under the tongue and there is no need to swallow. This is useful in women with significant nausea and vomiting. Vitamin D supplementation should be continued for the duration of breastfeeding. If vitamin D levels are normal, there is enough vitamin D in a good quality multivitamin for pregnancy and lactation.

**Women who struggle to keep their vitamin D levels within the normal range should continue with supplementation for the rest of their lives.**