APPROVED BY THE AUSTRALIAN AND NEW ZEALAND BONE AND MINERAL SOCIETY, OSTEOPOROSIS AUSTRALIA, AUSTRALISIAN COLLEGE OF DERMATOLOGISTS AND THE CANCER COUNCIL AUSTRALIA

RISKS AND BENEFITS OF SUN EXPOSURE POSITION STATEMENT

Summary statement

A balance is required between avoiding an increase in the risk of skin cancer and achieving enough ultraviolet radiation exposure to maintain adequate vitamin D levels.

Sun exposure is the cause of around 99% of non-melanoma skin cancers and 95% of melanoma in Australia[1], however, ultraviolet radiation B (UVB) exposure in small amounts is essential to good health. In Australia, where ultraviolet radiation levels are in the high to extreme range for most of the year, sun protective measures to reduce the incidence of skin cancer must continue as a high public health priority.

The majority of Australians generally have sufficient ultraviolet radiation exposure to enable adequate vitamin D production – serum 25-hydroxy vitamin D levels >50 nanomole/Litre (nmol/L) – to form and maintain healthy, strong bones.

It is well established that Vitamin D forms in the skin as a result of UVB exposure. However, there are few studies currently available that have investigated the amount of UVB that people require to synthesise adequate vitamin D[2]. There is evidence to suggest that prolonged or excessive sun exposure has no benefit in health outcomes related to Vitamin D[3]. Therefore, people should continue to protect themselves from overexposure, especially during peak ultraviolet radiation periods (10 am to 3 pm). Further scientific investigation of the amount of ultraviolet radiation exposure required to ensure adequate vitamin D levels in Australia is warranted.

People are at risk of vitamin D deficiency and may need vitamin D supplementation if their exposure to ultraviolet radiation is not adequate. People living in the southern parts of Australia have a higher risk of vitamin D deficiency, particularly during the winter months.

Recommendations

1. In most situations, sun protection to prevent skin cancer is required during times when the UV index is moderate or above ($\geq$3). At such times when the UV index is higher than or equal to 3, sensible sun protection behaviour is warranted and is unlikely to put people at risk of Vitamin D deficiency.

2. Most people achieve adequate vitamin D levels through the UVB exposure they receive during typical day-to-day outdoor activities. As an example, it has been estimated that adequate vitamin D levels (>50 nmol/l) can be achieved in summer by the face, arms and hands or the equivalent surface area being exposed to as little as an average of 5 minutes of sunlight either side of the peak UV periods on most days of the week. In winter, in the southern states of Australia where UV radiation levels are less intense, Vitamin D levels may be maintained by approximately 2-3 hours of sunlight exposure accumulated over a week to the face, arms and hands or equivalent surface area.

3. Certain people are at high risk of skin cancer. They include individuals who have had skin cancer, have received an organ transplant or are highly sun sensitive. These people need to have more rigorous sun protection practices and therefore should discuss their vitamin D requirements with their medical practitioner to determine if dietary supplementation rather than sun exposure is necessary.

4. Some groups in the community are at increased risk of vitamin D deficiency. These include the elderly, babies of vitamin D deficient mothers, people who are housebound or are in institutional care and dark skinned people, particularly those who cover their skin for religious or cultural reasons. These people should discuss their vitamin D status with their medical practitioner.

Vitamin D deficiency

Certain groups within the community are at higher risk of moderately severe vitamin D deficiency (indicated by serum vitamin D levels <25 nmol/L) if their sun exposure is inadequate. These include the elderly, babies (especially those of vitamin D deficient mothers), people who are housebound or are in institutional care, dark skinned people and those who cover their skin for religious or cultural reasons. Vitamin D levels between 25 and 50 nmol/L are classified as 'mild deficiency'.

Vitamin D status in Australia has not been widely studied in the general population, however some studies have shown that up to 80% of people in 'at-risk' populations display evidence of deficiency[4]. Mild vitamin D deficiency (25–50 nmol/L) was noted in 43% of females and moderately severe vitamin D deficiency (<25nmol/L) in 11% of females during winter in the Victorian population of Geelong (latitude 38ºS)[5].

Vitamin D production decreases during winter when the intensity of ultraviolet radiation is lower. The body can rely on tissue stores of vitamin D for between 30 and 60 days[4] assuming vitamin D levels are adequate prior to winter. In most cases, any vitamin D reduction during winter is corrected in summer when more sunlight is received with more time spent outdoors. While this correction may occur, it is still important to prevent deficiency during winter as fracture rates increase with deficiency, particularly with older adults.

Vitamin D deficiency in children can result in rickets, characterised by bone and muscle weakness and bone deformities. For adults with low vitamin D, problems may include osteoporotic fractures, bone and joint pain, falls, muscle and bone weakness, and difficulty in walking.

Bone and musculoskeletal health

There is evidence that sun exposure may be beneficial in reducing the risk of osteoporosis. The human body needs vitamin D to regulate calcium levels in the blood and to make and maintain healthy, strong bones.

Vitamin D is produced in the skin by exposure to UVB (wavelength 290–320 nm) from sunlight. It can also be obtained from foods such as milk, margarine, oily fish, eggs, liver and cheese, but is generally only present in small amounts in these foods. Most vitamin D is produced as a result of ultraviolet radiation exposure[6].

Most people achieve adequate vitamin D levels through typical day-to-day outdoor activities. As an example, it has been estimated that adequate vitamin D levels (>50 nmol/l) can be achieved in summer by the face, arms and hands or the equivalent surface area receiving as little as 5 minutes of sunlight exposure either side of the peak UV periods on most days of the week[7]. In winter, in the southern states of Australia where UV radiation levels are less intense, Vitamin D levels may be maintained by approximately 2-3 hours of sunlight exposure accumulated over a week to the face, arms and hands or equivalent surface area. In northern states, the amount of sunlight exposure required to receive adequate vitamin D levels is significantly less than this. Most people would achieve these levels of sunlight exposure with normal outdoor activities without needing to deliberately seek additional sun exposure.

Other health conditions

Recently, some studies have been published that suggest possible beneficial effects of sun exposure in the prevention or improvement in outcome of a number of other diseases including breast, prostate, and colorectal cancer, non-Hodgkin lymphoma and multiple sclerosis[8,9,10]. However the biological pathways underlying these observed associations are far from clear and it is not known how much sun exposure is necessary, and when. Thus there is insufficient evidence for any definitive action to be taken on these findings or make any recommendations, as more research is needed.

Older adults

Vitamin D deficiency is a problem in frail, housebound or institutionalised older Australians. It is related to increasing age (which is linked to reduced capacity to create vitamin D), and low levels of exposure to sunlight[4]. As the human body ages, it also becomes less efficient at synthesising new bone and making vitamin D, adding to the problem[11]. Older adults who are vitamin D deficient increase their risk of osteoporosis, falls, and fractures[12].

The National Health and Medical Research Council recommends that older adults boost their vitamin D intake through dietary means or by taking a daily supplement as prescribed by a medical practitioner[13].

Older adults who are not at high risk of skin cancer and who are mobile should ensure they have incidental exposure to sunlight, especially at times when ultraviolet radiation is less likely to cause other health problems.

Skin type

People with dark skin require more ultraviolet radiation exposure to produce adequate levels of vitamin D than people with fair skin, as the pigment in their skin reduces ultraviolet radiation absorption[14]. When people with dark skin cover themselves this further reduces the ultraviolet radiation available for vitamin D production. Children of mothers with inadequate vitamin D levels are also likely to be deficient[15]. Vitamin D supplementation is likely to be required for these population groups.

Babies

Australia's high ultraviolet radiation levels mean that even when babies are outdoors for very short periods before 10 am and after 4 pm with small amounts of skin exposed, they are likely to receive enough ultraviolet radiation exposure to maintain healthy vitamin D levels even with the use of sun protection.

Southern regions of Australia

For regions south of 37 degrees latitude (includes the southern parts of Victoria and Tasmania) there are relatively low levels of ultraviolet radiation for the months of June and July[16]. For this reason people in southern regions do not normally require sun protection during winter months unless they are at high altitudes or near highly reflective surfaces such as snow or water or unless they have a high risk of skin cancer.

Can being sunsmart increase your risk of vitamin D deficiency?

Sensible sun protection behaviour should not put people at risk of vitamin D deficiency.

While sun exposure is important for the production of vitamin D, it is important to keep in mind that unprotected sun exposure in Australia carries a significant risk of skin and eye damage and skin cancer. Consistent and deliberate sun exposure without any form of sun protection when the UV index is above 3 is not recommended, even for those diagnosed with vitamin D deficiency. The small amount of sunlight received on the face, hands, arms or legs during normal outdoor daily activities is usually all that is required to absorb appropriate levels of ultraviolet radiation at these times.

What are the alternatives?

Where there is vitamin D deficiency, oral vitamin D supplementation – rather than relying on sun exposure – may be necessary. A medical practitioner should be consulted about whether there is need for vitamin D supplementation.

Given the risks associated with the use of solaria and the amount of ultraviolet radiation they emit, Cancer Council organisations do not recommend the use of solaria in boosting vitamin D levels[17].

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