Sunbathing is needed for optimum health in the British Isles

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Oliver J Gillie,
writer and researcher
68 Whitehall Park,
London N19 3TN

Send response to journal:
Re: Sunbathing is needed for optimum health in the British Isles

Brian Diffey(1) suggests that exposure of hands, arms and face to the sun for a short time two or three times a week in autumn, spring or summer may provide a person in the UK with enough vitamin D to last throughout the year. However Diffey has used too low a figure for the daily vitamin D requirement and has failed to budget for this requirement on an annual basis, a procedure which is necessary because of seasonal differences in vitamin D synthesis in the skin.

In fact it is not possible to obtain a sufficient, healthy, level of vitamin D in the UK if Diffey's recommendations, which are similar to those of the SunSmart programme run by Cancer Research UK, are followed. That is why I have suggested, as noted by Diffey in your editorial, that the SunSmart programme should be abandoned(2,3).

Diffey reasons that weekly exposure of arms, hands and face may be relied upon to produce a total of 1 MED per week (MED = minimal erythemal dose – just enough sun exposure to redden the skin)(1). However in the UK this is only possible in those weeks in which the sun is strong and the sky is clear of cloud.

In the UK the sun is not strong enough between the end of September and the end of March to produce any significant amount of vitamin D(4). Furthermore many of the weeks when the sun is strong in the northern hemisphere (beginning of April to the end of the September) will be cloudy and overcast in the UK preventing any useful sunlight reaching ground level. And even when the sun is strong people are often working and unable to be outside. So over the period of a year a person in the UK will be lucky to be exposed to strong sun for one week out of three or four. If this is so then Diffey's figure for adequate weekly exposure to sunlight (when possible) should be multiplied by three or four to allow for sunless weeks.

However another error enters Diffey's calculations when he assumes that 600 to 1000 IU vitamin D per week (supplied by 1 MED of sunlight reaching hands, arms and face) provides enough vitamin D from the sun for optimum health(1). Such a dose will do little more than prevent rickets and gross osteomalacia and is likely to leave a person vulnerable to other disease in particular cancer. Recent research by Heaney and others in Omaha and Boston suggests that between 3,000 and 5,000 IU vitamin D is needed daily by an

adult for optimum health(5).

The human vitamin D requirement needs to be considered over the period of a year because vitamin D is stored during the summer months in the body and used in the winter. If we take Heaney's lower figure of 3,000 IU as the optimum daily requirement of vitamin D then the requirement over the period of a year is 1,095,000 IU. Diet can provide only a very small portion of this, less than 200 IU per day or 73,000 IU per year(5). The remainder, 1,022,000 IU, must be obtained from supplements or from the sun.

Vitamin D supplements sold over the counter in the UK supply relatively small quantities of the vitamin which are insufficient to substantially increase blood levels. Prescription products for vitamin D in the UK all consist of vitamin D2 (ergocalciferol) which has a potency about one third that of vitamin D3(6). So prescription products prescribed in recommended quantities in the UK are also likely to be ineffective in raising blood levels of D substantially.

In sunny countries sun exposure is the easiest way to obtain the major part of the vitamin D requirement. This is the natural way to obtain vitamin D and the way that people like to obtain it if they are able to and are not discouraged. The only other way is to buy high dose vitamin D tablets through the internet.

But is it possible to obtain an optimum annual dose of vitamin D, that is 1,022,000 IU or more, by sun exposure in the UK? The sun is generally strong enough in South East England to provide at least some useful vitamin D for 26 weeks between the first week of April and last week of September. However April is generally too cold for sunbathing, and throughout the summer cold winds or cloud frequently prevent sunbathing in south east England. The summer season is substantially shorter in Scotland where, in addition, the sun is less intense and there are more cold days.

Casual exposure of the hands, arms and face two or three times a week, as suggested by Diffey using Holick's criteria(1,7) might supply 1 MED to an adult in southern England, weather and time permitting. This will supply up to 26,000 IU of vitamin D. If the casual exposure of hands, arms and face could be increased from three to seven times per week then 61,000 IU could be obtained. This still leaves our subject with another 961,000 IU to find for optimum health.

In fact it makes no sense to try to increase vitamin D

intake simply by increasing exposure of hands, arms and face. Excessive sun exposure may cause skin aging and so it is preferable, as in radiology, to spread the dose. In this case the dose may be spread over all parts of the body by active sunbathing while protecting the face which tends to get over- exposed. Failure to recognise the advantage of spreading the UV dose over the whole body is another flaw in the SunSmart programme.

Active sunbathing which exposes the whole body can supply up to 10,000 IU per day(7,8). To obtain something approaching the optimum annual amount of vitamin D a person would have to sunbathe in a swimming suit on about 100 sunny summer days. This is, for practical purposes, impossible in the UK even for a dedicated nudist. There are about 182 days (26 weeks) when the sun is potentially strong enough for sunbathing in the UK, but in less than half of these will the sky be clear and the air warm enough for sunbathing.

A British sunbather, who is able to take time off work when the sun is shining brightly, might be able to sunbathe on 36 days in the year. This would probably be enough to provide a sub-optimum, but possibly safe, average blood level (higher in summer, lower in winter) of about 72 nmol/l of 25-hydroxycholecalciferol, equivalent to a daily dose of 1000 IU vitamin D.

Any discouragement from sunbathing in the middle of the day when vitamin D production from the sun is most efficient will prevent achievement of a safe blood level of vitamin D and is likely to have a detrimental effect on health of people in the UK. So the SunSmart programme, which forbids sun exposure in the middle of the day, is ill- suited to our climate. SunSmart is based on an Australian model and may possibly be suited to that climate but is completely unsuited to British weather.

If the assumptions made here are correct, these figures illustrate three points: a) the SunSmart recommendation that 10 to 15 minutes of sun on the face, arms and hands two or three times a week is sufficient for good health in the UK does not even provide minimum requirements of vitamin D, b) in the UK it is necessary to sunbathe whenever possible wearing as few clothes as possible if an amount of vitamin D approaching the optimum requirement is to be obtained, c) it is not possible for someone living in the UK to obtain a fully optimum dose of vitamin D from the sun alone.

Northern Europe is an extreme climate for man. Human beings evolved in tropical Africa where the sun shines strongly every day. The evolution of white skin, which allows more rapid utilisation of UV rays from the sun and greater synthesis of vitamin D, shows how important this vitamin is for general health and Darwinian reproductive fitness. Furthermore the cloudy maritime weather of the British Isles makes our climate one of the most extreme in Europe so far as sun deprivation is concerned.

Telling people to avoid the sun in the middle of day and to avoid tanning, which is an inevitable and normal consequence of sun exposure, makes our climate even more extreme. Such advice, as provided by SunSmart, will lead to insufficient levels of vitamin D unless a supplement is also taken, or an Inuit diet is followed – that is a diet consisting of oily fish or seal meat at every meal.

The low levels of vitamin D that may be expected to follow adherence to the SunSmart advice carry potential risks(9). Increasing evidence suggests that vitamin D plays a part in preventing a wide range of cancers with particularly strong evidence showing that vitamin D protects against the most common cancers, those of the breast, bowel, prostate and lymph glands(10-16). There is also evidence that vitamin D is important in protecting against multiple sclerosis(17-19), diabetes(20), hypertension(21) and a multitude of other ills(3).

Further fortification of foods with vitamin D in the UK is desirable but is not likely to happen in the near future and is unlikely ever to provide the complete requirement of vitamin D. So in the UK sunbathing is the easiest way to obtain levels of vitamin D that may protect against these diseases.

The benefit of sunbathing must be set against any risks of sun exposure. Skin cancer is very common in the UK, as elsewhere, but deaths from skin cancer are relatively rare compared with deaths from other cancers. Most skin cancer deaths are accounted for by melanoma which seems to occur less frequently in people who work outdoors and have regular exposure to the sun(22,23). Longer lifetime sun exposure has been found to be associated with lower risk of melanoma(24). So the risk of melanoma from sun exposure appears to be associated with irregular intense exposure of unconditioned skin, and possibly burning, rather than regular exposure to the sun which seems to be protective(25). Diet may also be a factor in melanoma as it is in other cancers(26,27).

The risks of insufficient vitamin D, although difficult to quantify exactly, would seem to far outweigh risks from excessive sun exposure(9). Careful sunbathing, taking care to avoid burning, may carry very little extra risk and may in fact protect against melanoma as well as other cancers. Exposure to the sun is a part of life for people living in traditional rural societies. Thus the onus is upon those who recommend additional sun avoidance in our already highly artificial lifestyle to show that the changes they recommend improve the balance of risks and benefits. Those who have promoted the SunSmart programme in the UK have yet to publish an adequate rationale for their policy.

Oliver Gillie BSc PhD Health Research Forum (www.healthresearchforum.org.uk) 68 Whitehall Park, London N19 3TN Telephone: 020 7561 9677

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