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Vitamin D levels in Norway may be inadequate to reduce risk of breast cancer

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Letter to the Editor, *Int J Cancer*

Sir:

The recent paper on vitamin D and breast cancer risk in Norway found no benefit for any vitamin D indices: solar ultraviolet-B (UVB) doses, vitamin D intake, sun seeking habits, use of sunbeds and frequency of sunburn.¹ This is in agreement with a similar study in Sweden (Ref. 59 in Ref. 1). However, there is ample evidence for ecological and observational studies that higher solar UVB doses and serum 25-hydroxyvitamin D [25(OH)D] levels reduce the risk of breast and several other cancers.²⁻⁵ Thus, we raise the question whether the variations in vitamin D indices in Norway are large enough to influence the risk of breast cancer.

The paper mentions that high oral intake of vitamin D was generally associated with cod liver oil. Cod liver oil has a high content of vitamin A (retinol). **Vitamin A competes with vitamin D.** A recent study in Europe found that vitamin A reduced the effect of vitamin D in colorectal cancer incidence by about 30% (Table 5 in Ref. 6). Thus, it is likely that vitamin A reduces the effect of vitamin D on breast cancer as well.

Norway is located at high latitudes, so that the annual solar UVB doses are small compared to those in temperate and tropical regions. According to a recent study from Tromsø, Norway, persons with a mean age of 56.8 years had serum levels of 25(OH)D that varied between winter and summer, from 52.4 to 60.6 nmol/L in 1994 and from 49.3 to 65.2 nmol/L in 2008.⁷ In view of the relationship between serum 25(OH)D level and breast cancer incidence, found in observational studies,⁵ these changes correspond to an 8% reduction in 1994 and a 17% reduction in 2008. However, differences of mean serum

25(OH)D levels between persons with low and high solar vitamin D-generating UVB exposures (VD-doses), (related to habits of sun seeking holidays, use of sunbeds, and frequency of sunburn) are probably much less than 16 nmol/L, as several of these indices represent sporadic rather than sustained vitamin D production. Without any information about serum 25(OH)D levels, it is impossible to arrive at any safe conclusions.

However, impacts of sun seeking holidays, use of sunbeds and frequency of sunburn can be linked together, as all three are associated both with vitamin D production and with non-melanoma skin cancer (NMSC) risk. A study of solid primary tumours in persons with a diagnosis of NMSC found a reduced risk of solid tumours in sunny countries but an increased risk in less sunny countries, including the Nordic countries.⁸ These findings were explained in terms of the percentage of body surface exposed to solar UVB as a function of latitude and temperature, being sufficiently high at low latitudes (below about 35°), but insufficient at higher latitudes.⁹

The effect of dietary factors on breast cancer risk was not discussed in Ref. 1. References 53 and 55 in Ref. 1 found that the fraction of energy derived from animal products were associated with increased risk of breast cancer. Being ecological investigations these studies integrate dietary intake over many years of life. It is now understood that diet early in life influences breast cancer risk more than diet later in life. Persons frequently enjoying sun seeking holidays and sunbed use may have diets different from persons with no such habits. This may be related to socioeconomic status which certainly also influences cancer risk.

Thus, the findings in Ref. 1 may probably just indicate that differences in serum 25(OH)D levels in Norway from oral intake or UVB exposures irradiance are inadequate to influence breast cancer risk. However, if levels were raised from about 60 nmol/L to 105 nmol/L, breast cancer risk might probably be lowered by 25%,⁵ and incidence and mortality rates from other diseases, including many other types of cancer, cardiovascular disease, diabetes, and several bacterial and viral infections might be reduced by 15-20%.¹⁰

Disclosure

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