Attention is needed to the high prevalence of vitamin D deficiency in our older population

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Abstract
The aim of this study was to assess the prevalence of vitamin D deficiency in females residing in one large, aged-care facility in Auckland. Thirty-nine residents, most of whom were able to go outdoors without assistance, were tested for midwinter 25-hydroxyvitamin D, and, of these, 36 were tested again in midsummer. The prevalence of frank hypovitaminosis (<10 µg/L) was found to be 49% in midwinter and 33% in midsummer. The vitamin D status of such at-risk individuals could be normalised either by 15-30 minutes of daily sun exposure or, alternatively, a programme of supplementation.


Data on the vitamin D status of older New Zealanders are limited to two small studies. The mean baseline spring serum 25-hydroxyvitamin D (25-OHD) level, the most widely accepted measure of body vitamin D, for 15
institutionalised Auckland men and women (mean age 80 years) was 24 µg/L. Following exposure to 30 minutes of sunlight per day over four weeks, the level rose by 7.4 µg/L. A recent Dunedin study among 38 non-institutionalised women over 70 years at high risk of fractures, revealed the prevalence of 25-OH levels below 40 nmol/L (16 µg/L) to be 26% in summer and 69% in winter. Reduced exposure to sun, as a result of declining mobility appears to be the main contributor to vitamin D deficiency in older adults. It has been estimated that in both the United States and Great Britain, about 30-40% of older patients with hip fractures are vitamin D-insufficient. However, there is strong evidence to suggest that, even during old age, improved vitamin D status can have profound benefits for bone health. In a double-blind placebo-controlled trial, 10 µg/day vitamin D supplement over one year significantly reduced wintertime bone loss and improved spinal bone density in healthy postmenopausal women. In a Finnish study, involving outpatients over the age of 85 years and municipal home residents aged 75-84 years, those randomly assigned to receiving an annual vitamin D injection experienced significantly fewer fractures over a five-year, follow-up period. In a randomised controlled trial of vitamin D (20 µg/day) and calcium (1.2 g/day) in a nursing home population of 3270 women (mean age 84 years), the supplemented group experienced 43% fewer hip fractures and 32% fewer non-vertebral fractures over an 18-month period.

In order to address the paucity of data on the prevalence of vitamin D deficiency in older New Zealanders, this study aimed to examine the vitamin D status of older women residing in one of Auckland’s largest aged care facilities.

Methods
Residents at Roskill Masonic Village were classified into three broad categories of care requirement: independent (IN - approximately 30%), frail mobile (FM - approximately 31%) and intermediate care (IC - approximately 39%). Those 91 women who had resided at the village for at least six months were considered eligible for inclusion in this study. Of these, 50 were randomly selected to give equal numbers across each care level. None were on medication affecting vitamin D bioavailability or its conversion to inactive metabolites. The study protocol was approved by North Health Ethics Committee and informed consent was obtained from each participant, or in one case, a proxy.

Participants provided one non-fasting blood sample at the end of July which was analysed for 25-OH (Incstar kit), calcium, phosphate, alkaline phosphatase (ALP), creatinine, gamma glutamyl transaminase (GGT), albumin and parathyroid hormone (PTH) at the Department of Endocrinology, Auckland Hospital. Participants were then informed of their vitamin D results and all were encouraged to follow the Public Health Commission recommendations regarding 15 minutes of daily sunlight exposure. Women were also interviewed to assess supplement use, outdoor activities, usual sunlight exposure, use of mobility aids and barriers to getting outdoors. A second non-fasting blood sample collected in February was analysed for 25-OH and PTH. All analyses were performed using the SAS procedure, MIXED (SAS Institute Incorporated, Technical Report p-229, Cary, NC (1992)).

Results
Of those 50 women randomly selected in June 1995, 21 took part in the study. The remainder were unable to take part mainly due to confusion, severe hearing impairment, hospitalisation or very poor health. Of the 41 eligible residents remaining, 29 were considered by the nursing sister as being able to participate and so were approached for recruitment. Of these, 18 agreed to take part, resulting in a total of 39 participants, with a disproportionately high number in the independent category (IN: n=21, 54%; FM: n=11, 28%; IC: n=7, 18%). The subjects ranged in age from 76-99 years. In February 1996, 36 subjects provided a second blood sample.

The mean midwinter 25-OH level was 10.44 µg/L (± 5.58 µg/L) and increased to 15.61 µg/L (±9.27 µg/L) in midsummer. The prevalence of 25-OH levels indicative of frank hypovitaminosis (<10 µg/L) was 49% in midwinter and 33% in midsummer, while the proportion of subjects below the clinical reference range for New Zealand adults (14-76 µg/L) was 74% and 58%, respectively.

Six subjects were using, or had recently used, vitamin D-containing supplements, in amounts varying from 2.5 µg to 10 µg/day. Seven subjects took supplemental calcium, three prescribed by their general practitioner at 1000 mg daily, whilst the remaining four self-medicated at varying doses below this level.

Conclusion
This study provides evidence that, in both summer and winter, vitamin D deficiency is common amongst a relatively independent and mobile group of women residents in a North Island aged care facility. Eighty-two per cent of the women were able to go outdoors without assistance. The study sample is clearly not fully representative of all institutionalised older women but is the largest study of institutionalised older New Zealanders which includes 25-OH measurements. Furthermore, a comparison of the care levels of participants and non-participants shows that non-participants were a more dependent and less mobile group, suggesting that the actual prevalence of deficiency in the facility studied was even higher than estimated. The prevalence of vitamin D deficiency in this study was similar to that reported in a similar study in Sydney, Australia, in a relatively independent population.

Given that vitamin D deficiency appears to be common in our older institutionalised population, what is being done to address this problem? One of us (SL) has worked in 20 Auckland aged-care facilities and has found no evidence in any (apart from one, as a result of it being the site for our study) that residents’ vitamin D status is given any consideration. Yet, there is a straightforward solution: 15-30 minutes of daily sun exposure, a daily halibut or cod-liver oil supplement, or vitamin D tablets.

The study also confirmed (data not shown) that limited sun exposure and poor mobility were the strongest predictors of poor vitamin D status. Interviews with participants revealed that barriers to greater sun exposure included concerns about skin cancer, the risk of falling or pneumonia in inclement weather, fear of falling and many excursions occurring mainly under cover. In view of the serious health implications of poor vitamin D status, there is a strong need to address these barriers, encourage residents of aged care facilities outdoors more often and to increase the use of vitamin D supplements. Supplements may be the most effective approach for those of poor mobility and who require a higher level of care.

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