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A case-control study of vitamin D status and asthma in adults

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It has been suggested that the rapid increase in the prevalence of asthma in developed countries in recent decades may be the result of changes in diet and lifestyle[(1)]. Asthma is associated with an alteration in the balance of T-helper lymphocytes with an increase in pro-inflammatory Th2 cells. As vitamin D may directly suppress Th2 differentiation[(2,3)], it has been hypothesised that low vitamin D status, as a consequence of sun avoidance behaviours and an increasingly indoor lifestyle, could contribute to the rising prevalence of asthma[(4)].

The present study was designed to compare the vitamin D status of age and sex-matched adults with and without physician-confirmed asthma. The study was conducted in the Chest Clinic, Aberdeen Royal Infirmary and the Department of Respiratory Medicine; Norfolk and Norwich University Hospital, Norfolk. One hundred and sixty participants aged between 18 and 50 years were recruited, 80 with physician-confirmed mild/moderate asthma and 80 age and gender-matched controls. Cases and controls were assessed within a month of each other to control for seasonal variation of sunlight exposure. Controls were individuals without asthma who had a smoking history of <10 pack-years. The majority of controls (70%) were recruited from local daycase surgery units, the remainder bring recruited after advertising in local press. Ninety-four participants were recruited in Aberdeen between June 2007 and April 2008, and 66 in Norwich between October 2007 and September 2008. Vitamin D status was assessed by serum 25-hydroxyvitamin D_3 measured by HPLC-tandem mass spectrometry.

Mean serum 25-hydroxyvitamin D_3 concentration was 8.68 ng/ml (95% CI 7.60, 9.75), being lower in Aberdeen 6.78 ng/ml (95% CI 5.32, 8.25) than Norwich 11.5 ng/ml (95% CI 10.2, 12.8). In Aberdeen, 76% of the participants had serum levels below the generally accepted cut-off for a deficiency of 10 ng/ml[(5)]. In Norwich, this figure was 42%. In winter (December–February), these proportions rose to 92.3% and 46.4%, respectively. There was no significant difference in the serum 25-hydroxyvitamin D_3 concentrations between cases and controls: 8.50 ng/ml (95% CI 7.06, 9.95) *v.* 8.86 (95% CI 7.22, 10.5). Conditional logistic regression adjusting serum 25-hydroxyvitamin D_3 levels for age, gender, smoking status, BMI and season of assessment revealed no difference in serum 25-hydroxyvitamin D_3 levels between cases and controls (OR asthma *v.* control 0.98 (95% CI 0.91, 1.04), $P = 0.50$). Similar multivariable analysis demonstrated association neither between 25-hydroxyvitamin D_3 levels and asthma severity nor lung function (FEV_1 % predicted).

This study does not find evidence to support the use of vitamin D as an adjunct to conventional therapy in asthma in adults.

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