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 D³ measured by HPLC-tandem mass spectrometry.

Mean serum 25-hydroxyvitamin D³ 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 D³ 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 D³ levels for age, gender, smoking status, BMI and season of assessment revealed no difference in serum 25-hydroxyvitamin D³ 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 D³ levels and asthma severity nor lung function (FEV₁ % 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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