Association Between Vitamin D Levels And Respiratory Infections In Overweight And Obese Adults

W. Thijs[1], R. Prein[2], C. Melissant[3], S. Middeldorp[4], F. Rozendaal[2], K. F. Rabe[5], M. den Heijer[2], P. S. Hiemstra[1], R. Mutsert[2],

[1]Leiden University Medical Center, Leiden, Netherlands, [2]Leiden University Medical center, Leiden, Netherlands, [3]Spaarne Hospital, Hoofddorp, Netherlands, [4]Amsterdam Medical center, Amsterdam, Netherlands, [5]University of Kiel, Grosshansdorf, Germany

Corresponding author's email: w.thijs@lumc.nl

RATIONALE: Vitamin D is inversely associated with inflammation and immunity. Whereas obese patients have lower serum concentrations of $25(OH)D_3$, several studies indicated that vitamin D deficiency is related to respiratory tract infections. This relation could be influenced by obesity, and therefore we aimed to investigate the association between vitamin D concentrations and respiratory infections in overweight or obese adults.

METHODS: This is a preliminary cross-sectional analysis of baseline measurements of the NEO (Netherlands Epidemiology of Obesity) study, a cohort of adults aged 45 to 65 years with a body mass index (BMI) ≥27 kg/m^2 that will include up to 6000 adults. We used logistic regression analysis to study the association between serum 25-hydroxyvitamin D levels and recent common cold, adjusted for age, sex, BMI, asthma, ethnicity, smoking (in pack years), waist circumference and month of the year. We divided the cohort in four vitamin D categories: <30 nmol/L (n=223), 30 to 50 nmol/L (n=515), 50 to 75 nmol/L (n=521) and ≥75 nmol/L (n=138). Recent common cold was recorded using a questionnaire and defined as a common cold within the last month before baseline.

RESULTS: Between 09-2008 and 11-2009, 1397 participants were included in the NEO study. The mean (± SD) age was 56 ± 6 years, BMI 31 ± 4 kg/m^2, FEV_1 % predicted 102.5 ± 15.5%, $25(OH)D_3$ 50.6 ± 20.1 nmol/L; 49% were men, 94% were Caucasian and 6% had asthma. BMI was inversely associated with vitamin D concentrations [beta -0.861, 95%CI -1.13,-0.598]. The seasonal influences on vitamin D and common cold are shown in figure 1 and 2. The prevalence of a recent self-reported common cold was higher in the groups with lower vitamin D concentrations (Table 1). Crude analysis showed that individuals with a concentration lower than 30 nmol/L $25(OH)D_3$ had a 3-fold higher risk of common cold, compared with the group with $25(OH)D_3$ concentration of 75 nmol/L or higher. Adjustment for all confounders attenuated the ORs, although a nonsignificant trend remained of a 1.7 fold [95%CI 0.8-3.7] higher risk of common colds in the lowest compared with the highest group of $25(OH)D_3$ (table 1).

Figure 1: Serum 25(OH)D3 concentrations throughout the year in 1397 adults of 45-65 years old with a BMI≥ 27 kg/m2.

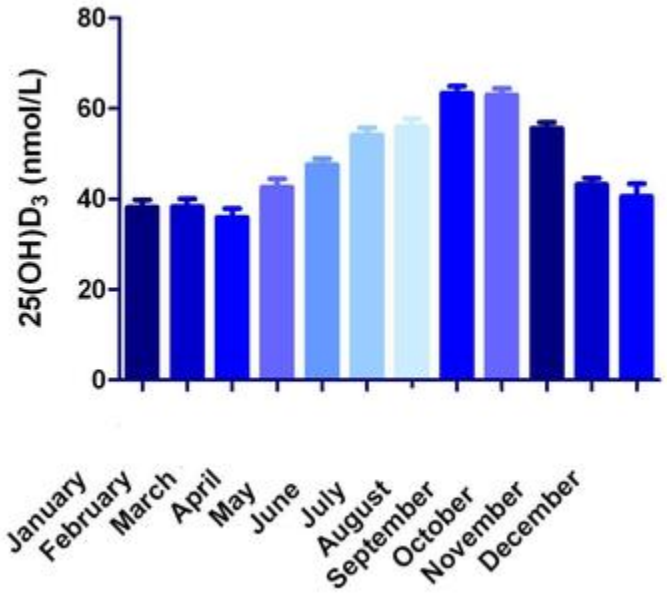

Figure 2: Common colds throughout the year in 1397 adults of 45-65 years old with a BMI≥ 27 kg/m2.

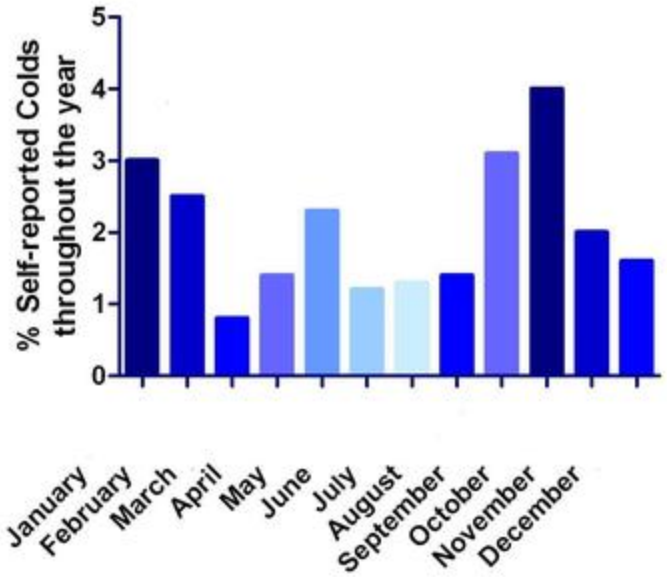

Table 1. Odds ratios with 95% confidence intervals of recent self-reported common cold in four categories of vitamin D concentration in 1397 adults of 45-65 years old with a BMI≥ 27 kg/m2.

	Crude	Multivariate[1]	Multivariate[2]	Multivariate[3]
$25(OH)D_3$	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
>75	1	1	1	1
50-75	1.1 0.6-2.0	0.9 0.5-1.8	0.9 0.5-1.7	0.8 0.4-1.6
30-50	1.6 0.9-3.0	1.5 0.8-2.7	1.4 0.7-2.6	1.1 0.6-2.1
<30	3.1 1.6-6.1	2.6 1.3-5.1	2.4 1.2-4.9	1.7 0.8-3.6

1 adjusted for age, sex, asthma, being Caucasian or not and smoking (in pack years)
2 adjusted for age, sex, **BMI**, asthma, being Caucasian or not, smoking (in pack years) and **waist circumference**
3 adjusted for age, sex, BMI, asthma, being Caucasian or not, smoking (in pack years), waist circumference and **month of the year**

CONCLUSIONS: This preliminary analysis indicates that vitamin D might also play a protective role against viral infections in overweight and obese individuals.

This abstract is funded by: none

Am J Respir Crit Care Med 185;2012:A1798

Internet address: www.atsjournals.org **Online Abstracts Issue**