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Vitamin D status in COPD patients: a preliminary seasonal observation study

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Chronic obstructive pulmonary disease (COPD) is characterised by irreversible airflow obstruction and affects three million individuals within the UK[(1)]. One in four COPD patients present with sarcopenia, which has been associated with a poorer chance of survival[(2)]. Vitamin D may help prevent the progression of COPD by a) prevention of infections and exacerbations through immune modulation[(3)] and b) prevention of sarcopenia by maintaining fat free mass (FFM) and muscle strength[(4)]. The aim of the current study was to assess seasonal fluctuations in vitamin D status and any associated changes in FFM and muscle strength in COPD patients.

To date, 39 COPD patients have provided consent and completed both time-points of the study; once at the end of winter and once at the end of summer, corresponding to the nadir and peak of vitamin D status respectively. Height (m) and weight (kg) were measured at both time-points, together with FFM (kg) using bioelectrical impedance (Tanita Cooperation, Tokyo, Japan) and muscle strength (kg) using hand-grip dynamometry (Takei Scientific Instrument Company Limited, Japan). Non-fasting 10 ml blood samples were obtained at both time-points and used to quantify serum 25-hydroxyvitamin D (25(OH)D) concentration as a measure of vitamin D status, using the gold standard liquid chromatography-tandem mass spectrometry (API 4000, AB SCIEX).

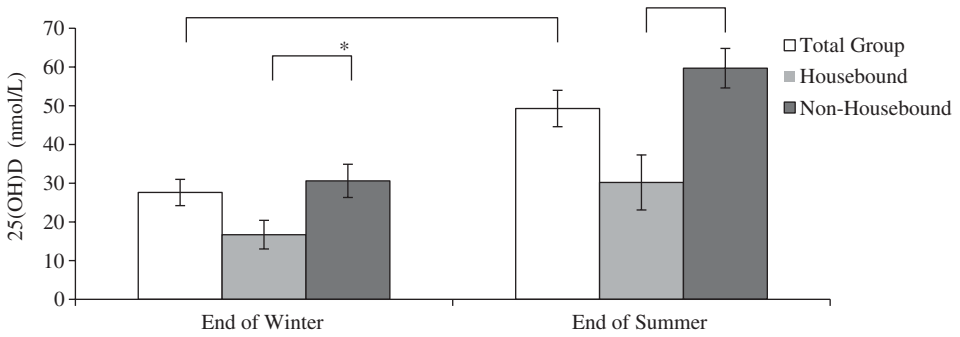

Fig 1. Bar chart of mean (±SD) 25(OH)D concentrations for the total group (*n* 39), housebound patients (*n* 10) and non-housebound patients (*n* 29) at end of winter and end of summer. $*P < 0.05$; $**P < 0.01$.

Following paired t-tests in the total group, mean (SD) 25(OH)D concentration was significantly lower at the end of winter, compared to end of summer (27.9 (20.4) *vs* 50.5 (26.8) nmol/L respectively; $P < 0.001$) and this was more evident in housebound patients compared to those who were not housebound. In regression analysis, 25(OH)D concentration was not significantly associated with FFM (kg) at either time-point; however, 25(OH)D concentration was positively associated with muscle strength at both end of winter and end of summer ($\beta = 0.29$; $p = 0.004$ and $\beta = 0.14$; $p = 0.031$, respectively).

Owing to the favourable effects of vitamin D status on muscle strength, there may be a requirement for vitamin D supplementation during winter months in non-housebound COPD patients and all year round supplementation in their housebound counterparts.

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