COVID-19 and vitamin D: what does the current scientific evidence tell us?

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with Professor Susan Lanham-New

Five key messages to take away

1. **The discovery of the expression of nuclear vitamin D receptors (VDR) and vitamin D metabolic enzymes in immune cells provides a scientific rationale for the potential role of vitamin D in maintaining immune homeostasis (Hewison et al 2012).** However, population-based studies and randomised controlled trials have not shown convincing links and further research is urgently required.

2. **It has been claimed in the scientific literature and media that vitamin D supplementation is effective in reducing acute respiratory tract infections (ARTI).** However, the *actual* scientific evidence is mixed; with some systematic reviews/meta-analyses showing a beneficial effect whilst others did not. Recent large vitamin D supplementation randomised controlled trials for vitamin D and ARTI have not demonstrated a positive effect for vitamin D in reducing ARTI's.

3. **The continued spread of the novel SARS-CoV-2 virus, and the disease COVID-19 that is caused by SARS-CoV-2, has led to calls for widespread high dose vitamin D supplementation.** These calls are without support from pertinent studies in humans at this time, but rather based on speculations about *presumed* mechanisms [Lanham-New et al. 2020].

4. **There have been some interesting observational and correlational studies linking COVID-19 and vitamin D status but results are 'hypothesis-generating' and none published to date prove cause' and 'effect'.** Avolio et al. (2020) found that median serum 25(OH)D levels in a 2020 PCR positive cohort were statistically significantly lower compared with those in a 2020 PCR negative cohort. When stratified by age, for those aged 0 to 70 years there was no difference in median serum 25(OH)D levels. For those aged over 70 years the 2020 PCR test positive cohort had a statistically significantly lower median serum 25(OH) D level than both the 2020 negative. Additionally, a correlational study examined the association between mean serum 25 (OH)D and the number of deaths from COVID-19 in older adults across 12 European countries. A statistically significant degree of negative correlation between mean serum levels and the number of deaths from COVID-19 per million population was found (Laird et al. 2020).

5. **At a population and individual level, it is important to maintain vitamin D levels; not for the prevention of COVID-19 but for the protection of musculo-skeletal health** . Government advice remains that the general population intake recommendations should be followed; taking a daily supplement (400IU /d [10 µg/d] in the UK and eating foods that provide vitamin D; both are particularly important during periods of self-isolating [NHS, UK].

References and further reading

Hewison, M. (2012). An update on vitamin D and human immunity. *Clinical endocrinology*, *76*(3), 315-325.

Lanham-New, Susan A., et al. (2020) "Vitamin D and SARS-CoV-2 virus/COVID-19 disease." *BMJ Nutrition, Prevention & Health*.

Laird, E., J. Rhodes, and Rose Anne Kenny. (2020) "Vitamin D and inflammation: potential implications for severity of COVID-19." *Irish med J* 113 P81.

Avolio, Antonio, et al. (2020) "25-hydroxyvitamin D concentrations are lower in patients with positive PCR for SARS-CoV-2." *Nutrients* 12.5: 1359.

Ilie, Petre Cristian, Simina Stefanescu, and Lee Smith. (2020) " The role of vitamin D in the prevention of coronavirus disease 2019 infection and mortality." *Aging Clinical and Experimental Research*: 1-4.

Reflective learning questions

What was your main reason for attending?
What are the recommended daily intakes and upper limit supplementation of vitamin D for the UK population?
During the COVID-19 pandemic, what are the current recommendations?
Why can conclusions not be made from observational and correlational studies?