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The Link Between Vitamin D and Depression

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Abstract:**Aim:**

Recent studies have shown that insufficient or deficient vitamin D status may be linked to increased risk of depressive conditions or depression. The aim of this paper was to review all available evidence on vitamin D, depression, and any association between them.

Methods :

Cross-sectional, randomized and cohort studies have reported contradictory results. Some have reported that low levels of vitamin D may be associated with higher risk of depression or depressive symptoms. Recent clinical trials examining the effects of vitamin D supplementation on depression have also showed discrepant results. Vitamin D deficiency is very common, and prevalence of depression is increasing in the Asian population, especially females. Considering research results of a potential inverse association between vitamin D level and prevalence of depression, it is important to advance our understanding of the role of vitamin D in depression and conduct well-designed prospective trials in the Asian population.

Results:

Empirical studies appear to provide increasing evidence for an association between vitamin D insufficiency and depression, and for vitamin D supplementation and augmentation in those with clinical depression who are vitamin D deficient. Methodological limitations associated with many of the studies are detailed.

Introduction:

Vitamin D is a unique secosteroid hormone formed mainly by photosynthesis, so an indoor lifestyle and sun-avoidance leads to deficiency. There has been an increase in the prevalence of Vitamin D deficiency and a ten-fold increase in spending on supplements in the US over the last decade. Knowledge of Vitamin D has grown exponentially and 95% of our current knowledge was published in the last 15 years. This demonstrates new mechanisms and diseases associated with deficiency including cancer, cardiovascular disease, diabetes, and premature mortality. Whilst Vitamin D was believed to follow Funk's model of vitamins, having a single mechanism and function limited to calcium and bone metabolism, the mechanisms of action of Vitamin D are now recognized to be endocrine, paracrine and autocrine via Vitamin D receptors (VDRs) affecting most physiological systems, including the brain. The enzymes necessary for the hydroxylation of 25hydroxyvitamin D (25OHD) to the active form 1,25dihydroxyvitamin D are present in the hypothalamus, cerebellum, and substantia nigra. Vitamin D modulates the hypothalamic-pituitary-adrenal axis, regulating adrenalin, noradrenalin and dopamine production through VDRs in the adrenal cortex and protects against the depletion of dopamine and serotonin centrally. Therefore, biological plausibility for the action of Vitamin D in depression has been established. Epidemiological evidence shows that Vitamin D deficiency is associated with an 8%–14% increase in depression and a 50% increase in suicide.¹

Discussion:

There has been research examining the relationship of vitamin D to seasonal affective disorder (SAD), schizophrenia, and depression. Several studies have examined whether light therapy improved mood. randomized 29 patients in a parallel fashion to either one hour or 15 minutes of light therapy in the morning for two weeks in the winter. One hour of light therapy significantly decreased depressive symptoms more so in the group with SAD than the control group. randomized 15 participants with SAD to either of vitamin D (one time dose) ($n = 8$) or phototherapy ($n = 7$). They reported that depression decreased in persons who received vitamin D as compared to those who received phototherapy. There were no untoward side effects from the dose of vitamin D however, a limitation of the study was the one time dose.³

Cross sectional study included three women aged 30 to 45 with depression, all of whom were taking antidepressants. The women were also being treated for type 2 diabetes or an underactive thyroid gland. All three were deficient in vitamin D, with levels that ranged from 8.9 to 14.5 nanograms per milliliter of blood (ng/mL). Levels below 21 ng/mL are considered vitamin D deficient. Normal vitamin D levels are above 30 ng/mL, according to guidelines set by The Endocrine Society. The women received vitamin D therapy for eight to 12 weeks to replenish their blood levels. After treatment, their levels increased to 32 to 38 ng/mL. The women also reported corresponding improvements in symptoms of depression following vitamin D therapy. One woman's depression score changed from one indicating severe depression to mild depression. Another woman's score improved to a level suggesting she had just minimal symptoms of depression.⁴

Recently, reported in a population-based cohort study of over 1,200 persons aged 35 and older, that levels of 25 (OH) D were 14% lower in persons with minor depression and 20% lower in persons with major depressive disorder when compared to controls . The Center for Epidemiologic Studies-Depression (CES-D) scale was used to assess for depression, and persons also had a psychiatric evaluation using the Diagnostic Interview Schedule to verify their mental status. Depression severity was associated with low serum 25 (OH) D, even after adjustment for age, sex, body mass index, smoking status, and the number of chronic conditions .

The mechanism whereby vitamin D may be associated with mental disorders such as depression is not clearly understood. It has been reported that there are vitamin D receptors in the hypothalamus, which may be important in neuroendocrine functioning .Some investigators have reported that vitamin D is important for brain development .reported that when rats were born to vitamin D deficient mothers, this negatively affected the development of their brain in terms gross morphology, cellular proliferation, and growth factor signaling. They also had decreased expression of nerve growth factor.²

Conclusion:

In this report, I compared between different studies of the relation between vitamin D and depression and they were similar to each other in results that vitamin D have an effect on mood and connected to other mental disorders .

References:

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