

## Vitamin D: Does it play a role in psychiatry?

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Some People may be surprised to see a psychiatrist writing about a bone vitamin, but with recent advances in biomedical science and research, a number of non-skeletal diseases including major mental illnesses have been found, to be associated with Vitamin D deficiency.

Since its discovery in 1921, vitamin D is well-known for its role in calcium homeostasis and bone health, while inadequate levels of vitamin D have been associated with bone disorders such as rickets, osteomalacia, and osteoporosis.<sup>1</sup> However, these disorders can be considered the tip of vitamin D deficiency iceberg. The recent findings that most body tissues and cells including the brain have vitamin D receptors, has provided new insights into the function of this vitamin.<sup>2</sup>

Vitamin D deficiency has been identified as a global problem with an estimated one billion people worldwide suffering from vitamin D deficiency or insufficiency. Studies in United States, Saudi Arabia, the United Arab Emirates, Australia, Turkey, India, and Lebanon, have indicated that 30 to 50% of children and adults have 25-hydroxyvitamin D levels under 20 ng per milliliter.<sup>2</sup> In Pakistan nationally representative data on the vitamin D status does not exist but a few observational studies have been done in this area at the Aga Khan University Hospital (AKUH). Two studies that were conducted at AKUH, showed a prevalence of 70% and 97% vitamin D deficiency in healthy asymptomatic subjects.<sup>3</sup> Two cross sectional studies carried out in Karachi and Lahore on clinical populations excluding psychiatric patients, reported a 92% and 81% prevalence of vitamin D deficiency respectively.<sup>4,5</sup>

Vitamin D deficiency has been found to be associated with major mental disorders such as depression, schizophrenia, and alcoholism but the causation is not well established yet.<sup>6</sup> However, association is not synonymous with causation. For example if A is associated with B, then perhaps A could cause B, or possibly B could have caused A, or alternatively a third factor(s). C, could have been the cause of both A and B. Therefore, if vitamin D deficiency is associated with depression then the possibilities are that depression caused the vitamin D deficiency or, vitamin D deficiency caused the depression, or, an unknown factor(s), perhaps genetic factors, were the cause of both, depression and vitamin D deficiency.

It is an interesting point to note that in the last decade, there has been some evidence, that besides other factors, depression is also associated with vitamin D deficiency, Wilkins et al examined a group of elderly subjects and found mean Vitamin D levels of 18.58 ng/mL, with 58% of subjects being frankly deficient, in that their level were below 20 ng/mL. In conclusion, low vitamin D was robustly associated with the presence of mood disorder (oddsratio11.7, 95%CI2.0-66.9).<sup>7</sup> In some intervention studies, Gloth et al randomized eight subjects with seasonal affective disorder, were given 100,000 IU of vitamin D and seven subjects received phototherapy. Findings indicated that Vitamin D, and not phototherapy was associated with improvement.<sup>8</sup> In another randomized, placebo, control trial involving 441 overweight and obese subjects, vitamin D level and depression was assessed. Subjects were given either 20,000 IU or 40,000 IU of vitamin D or placebo for one year. Depressive symptoms were then reassessed over the course of a year. Prior to treatment, vitamin D deficient subjects reported greater depressive symptoms as compared to individuals with normal vitamin D levels. After one year there was a significant improvement in depression scores among treatment group than, the placebo group.<sup>9</sup> This has been replicated in other observational studies too involving adults and elderly population. One of these studies showed positive association between vitamin D deficiency and depression as well as cognitive impairment.<sup>10,11</sup>

To the author's knowledge till date there is a dearth of research addressing this grievous issue of high prevalence of vitamin D deficiency in Pakistan. It is surprising that despite having adequate sunlight during all seasons in Pakistan there is a deficiency of this sunshine vitamin. Some possible causes in our country could be dark skin, use of sun blocks, religious customs such as observation of purdah, inadequate sun exposure, and insufficient dietary supplies of Vitamin D.<sup>3</sup> As compared to normal individuals it is possible that psychiatric patients are more vulnerable to vitamin D deficiency. Individuals with chronic psychiatric problems are most likely to be restricted to their homes, which would deprive their exposure to sunlight.

Vitamin D deficiency is common and often unrecognized and yet may be an important contributor to psychiatric illnesses so we should not leave this serious issue

unresolved. Perhaps this could be an answer to many unanswered questions in psychiatry regarding the etiology of major psychiatric disorders. The first step would be to explore its association with major mental illnesses by conducting large cross sectional studies in this specific population. Randomized placebo controlled trial would also be needed to establish causation between vitamin D deficiency and psychiatric illnesses.

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