Original Article

Vitamin D Deficiency among Psychiatric Outpatients

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Abstract

Vitamin D is not only known for building up strong bones but also keeping healthy mind. Many of the recent researches have shown correlation of the psychiatric illness with the Vitamin D deficiency. 25-hydroxyvitamin D (25(OH)D) is the principal vitamin D metabolite measured to determine vitamin D status in the body. Although previous researches have found out the Vitamin D levels in specific psychiatric disorders but the present study is a unique effort and preliminary kind of study in this regard. It examined the prevalence of Vitamin D levels in a varied group of psychiatric out-patients.

Keywords: Vitamin D deficiency, depression, somatoform

Introduction

Vitamin D is well-known for maintaining calcium homeostasis and healthy bones. The inadequate levels of vitamin D have been associated predominantly with bone disorders of defective mineralization such as rickets, osteomalacia, and osteoporosis.1

The research has also shown the correlation of low levels of Vitamin D with the metabolic disorders. An epidemiologic study found that adults with 25-hydroxyvitamin D (25(OH)D) levels < 21 ng/mL had an increased risk of hypertension, diabetes, obesity, and dyslipidemia.2

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.3

The role of Vitamin D in psychiatric illnesses is suggested by specific expression of vitamin D receptors in the cingulate cortex, thalamus, cerebellum, amygdala, and hippocampus.4 Most of these regions also express 1α-hydroxylase enzymes capable of metabolizing 25(OH)D to 1,25(OH)2D3, which suggests that vitamin D may have an autocrine or paracrine function in brain.5 Vitamin D also regulates expression of tyrosine hydroxylase which is the rate-limiting enzyme in the biosynthesis of dopamine, norepinephrine, and epinephrine.6 Vitamin D promotes neuronal survival by inhibiting oxidative pathways in the brain through inhibition of inducible nitric oxide synthase7 (reducing free radical formation) and upregulation of γ-glutamyl transpeptidase8 (increasing antioxidant production).

The lack of exposure to sunlight and dietary deficiency of Vitamin D are common in patients developing psychiatric disorders.9 Dark skin, use of sun blocks, certain religious customs such as purdahsystem also make a person vulnerable to develop Vitamin D deficiency.10

Low levels of vitamin D are associated with depression, cognitive dysfunction and seasonal affective disorder. Evidence also suggests a potential link between vitamin D deficiency and psychotic disorders. It is not clear whether vitamin D deficiency is a cause or effect of depression. Limited research suggests vitamin D supplementation might have a role in treating depression and Seasonal Affective Disorder. The recent data also suggest...
high prevalence of Vitamin D among patients with Bipolar Disorder. The supplements of Vitamin D have proven to be beneficial in the above psychiatric disorders.

Materials and Methods

After taking approval from ethical committee of the institute, the present study was conducted in patients attending Psychiatry OPD at Guru TegBahadur Hospital, Delhi. It is a cross-sectional study involving a sample of 112 patients done over a period of year 2013 where every patient had detailed Psychiatric evaluation. The patients were diagnosed with psychiatric illness as per ICD-10. After taking consent from the patients, all patients were screened for Vitamin D levels. The patients were tested for serum 25(OH)D levels using radioimmunoassay. Vitamin D levels are expressed as ng/mL or nmol/L; the conversion factor from ng/mL to nmol/L is 2.496. The patients were classified into three categories having different levels of vitamin D as described underneath.

- Deficient < 25 nmol/L
- Insufficient 25-50 nmol/L
- Normal > 50 nmol/L

Inclusion criteria

1. All patients attending Psychiatry OPD in the age group of 18-60 years who consented to participate in the study.

Exclusion criteria

1. Patients with chronic medical illness.
2. Patients who refuse to give consent.
3. Patients who refuse to undergo laboratory test for Vitamin D.

Results

Out of 120 cases, 112 were enrolled in the study following inclusion/exclusion criteria. 64 (57.14%) males and 48 (42.85%) females participated in the study. According to ICD-10 diagnosis 22 (19.64%) patients had somatoform disorder out of which 20 (17.85%) had deficient levels and 2 (1.78%) had insufficient levels of Vitamin D. 16 patients (14.28%) had a diagnosis of Depressive disorder out of which most of the patients (N = 14, 12.5%) had deficient levels and 1 (0.89%) had insufficient level and only 1 (0.89%) had normal Vitamin D. Out of 10 (8.9%) patients with Bipolar affective disorder, 8 (7.14%) had deficient levels and 3 (2.68%) fell into the insufficient Vitamin D level category. 13 patients (11.60%) of Schizophrenia and psychotic spectrum disorder were enrolled for Vit D. Among them 10 (8.92%) patients were found to have deficiency and 3 (2.68%) had insufficient levels of VitD. The 20 (17.85%) patients of Generalized anxiety disorder were screened and 15 (13.39%) reported deficiency and 4 (3.57%) had insufficient levels. But only 1 (0.89%) patient of GAD reported to have normal value of Vitamin D. All the 4 (3.57%) patients of Phobic disorder had deficiency of Vitamin D. When 8 (7.14%) patients of the OCD were subject to testing, 6 (5.35%) had deficient and 2 (1.78%) had insufficient levels of Vitamin D. out of the 3 (2.68%) patients with dissociative disorder 2 (1.78%) had deficiency and 1 (0.89%) had insufficient levels of Vitamin D. Even the patients with the sleep disorders (N=4, 3.57%) had deficient (N=3, 2.68%) and insufficient levels (N=1, 0.89%). Not only this the patients with the alcohol dependence too reported with low levels of Vitamin D. 12 (10.71)

Table showing total 112 cases (Males-64; females-48) evaluated for Vitamin D deficiency

<table>
<thead>
<tr>
<th>Psychiatric Disorder</th>
<th>N (%)</th>
<th>Deficient (%)</th>
<th>Insufficient (%)</th>
<th>Normal (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schizophrenia</td>
<td>13 (11.60%)</td>
<td>10 (8.92%)</td>
<td>3 (2.68%)</td>
<td>—</td>
</tr>
<tr>
<td>Bipolar Disorder</td>
<td>10 (8.9%)</td>
<td>8 (7.14%)</td>
<td>2 (1.78%)</td>
<td>—</td>
</tr>
<tr>
<td>Unipolar Depression</td>
<td>16 (14.28%)</td>
<td>14 (12.5%)</td>
<td>1 (0.89%)</td>
<td>1 (0.89%)</td>
</tr>
<tr>
<td>GAD</td>
<td>20 (17.85%)</td>
<td>15 (13.39%)</td>
<td>4 (3.57%)</td>
<td>1 (0.89%)</td>
</tr>
<tr>
<td>Phobic Disorder</td>
<td>4 (3.57%)</td>
<td>4 (3.57%)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>OCD</td>
<td>8 (7.14%)</td>
<td>6 (5.35%)</td>
<td>2 (1.78%)</td>
<td>—</td>
</tr>
<tr>
<td>Somatoform Disorder</td>
<td>22 (19.64%)</td>
<td>20 (17.85%)</td>
<td>2 (1.78%)</td>
<td>—</td>
</tr>
<tr>
<td>Sleep disorder</td>
<td>4 (3.57%)</td>
<td>3 (2.68%)</td>
<td>1 (0.89%)</td>
<td>—</td>
</tr>
<tr>
<td>Dissociative disorder</td>
<td>3 (2.68%)</td>
<td>2 (1.78%)</td>
<td>1 (0.89%)</td>
<td>—</td>
</tr>
<tr>
<td>Alcohol dependence</td>
<td>12 (10.71%)</td>
<td>10 (8.92%)</td>
<td>2 (1.78%)</td>
<td>—</td>
</tr>
</tbody>
</table>

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alcoholic-dependent patients had deficiency reporting in 10 (8.92%) patients and 2 (1.78%) had insufficient levels of 25 OH(D).

Discussion

In our study the majority of the patients of somatoform followed by GAD, depressive disorder and then psychotic patients and bipolar affective disorders reported high prevalence of low levels of Vitamin D. This is in accordance with the previous population based researches done sporadically in specific psychiatric disorders showing the deficiency of Vitamin D.

The Third National Health and Nutrition Examination Survey studied in a sample of 7,970 non-institutionalized U.S. residents aged 15 to 39 that individuals with serum vitamin D d"50 nmol/L are at a significantly higher risk of developing depression than those with vitamin D e"75 nmol/L. The study done by Mayo clinic has shown correlation of depression with deficient levels of Vitamin D. Wilkins et al found out in a group of elderly subjects the mean Vitamin D levels to be 18.58 ng/mL, with 58% subjects with levels below 20 ng/mL reporting frank deficiency. It was thus concluded that, low vitamin D was strongly associated with the presence of mood disorder (oddsratio 11.7, 95% CI2.0 - 66.9). Gloth et al randomized the subjects with seasonal affective disorder. Seven subjects received phototherapy and 8 were given 100,000 IU of vitamin D. It was found out that the subjects given Vitamin D showed improvement rather than those who were subject to phototherapy.

A research in Norway has also shown consistently low levels of 25OH(D) among patients presenting with psychotic symptoms. A study of 8,411 Swedish women also revealed that low vitamin D levels were associated with psychotic symptoms.

One of the recent researches have been done in Waikato region in New Zealand. Among the 19 participants with severe deficiency of Vitamin D (< 25 nM), 13 had a diagnosis of schizophrenia. This equates to 34% of participants with that diagnosis, compared to 9.4% of other participants (n = 102, p = 0.003). Taken together, disorders in the schizophrenia spectrum (schizophrenia and schizoaffective disorder) were over-represented among those with Vitamin D deficiency and had markedly reduced average levels (n = 49, mean = 36.4 nM, one-sample t = 6.58, p < 0.001) compared to the other diagnostic groups, none of which showed a mean difference from the deficiency threshold of 50 nM.

A research done in Italy concluded that persons with severe vitamin D deficiency (< 25 nmol/L) had a higher risk of substantial cognitive decline than those with sufficient levels (≥ 75 nmol/L) as is evident on scores of Mini mental status examination.

Conclusion

The prevalence of Vitamin D is high among the psychiatric patients. The patients with vitamin D deficiency often present with vague symptoms which includes tiredness and general aches and pains. Majority of the patients belonged to the group of somatoform disorder who often present with the vague body aches. But even the people without any symptoms were found to have Vitamin D deficiency. They need to be addressed and be given Vitamin D supplements.

Limitations

The sampling done was non-randomized because of which the finding of the study can only be representative of the study population and cannot be extrapolated to the community at large. Longitudinal studies involving larger samples selected by systematic sampling methods would be needed to estimate true prevalence of Vitamin D levels in these patients.

References

135-145.