



Prevalence of Vitamin D Deficiency in patients admitted in State Mental Health Hospital: A Cross Sectional Study

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Abstract

Aim: To evaluate the prevalence of vitamin D and analyse its correlation with various clinical parameters in patients admitted in HHMH & R, Shimla.

Material and Methods: Cross-sectional analysis was conducted at the HHMH & R, Shimla. 46 patients in total with a primary psychiatric diagnosis as per ICD 10 were included and assessed for vitamin D levels and was correlated with clinical parameters. Vitamin D deficiency was taken as serum 25-hydroxyvitamin D level ≤ 20 ng/mL.

Results: In our observation 30.4% patients had deficient and around 41.3% had insufficient vitamin D levels. It was higher in females (41.7%) in comparison with males (26.5%). Prevalence was higher in patients with age more than 30 yrs. (21.7%), with co-morbidities (21%) and psychotic patients. No significant co-relation was found in vitamin D levels and gender, age, psychiatric diagnosis but significant correlation was there with presence of co-morbidities.

Conclusion: Vitamin D deficiency was found higher in psychiatric inpatients. Higher age also came across as a risk factor. Regular screening of which should be done as routine practice and supplementation or lifestyle modifications should be advised as and when required

Keywords: Himachal Hospital of Mental Health and Rehabilitation (HHMH&R).

Introduction

Vitamin D deficiency is a widespread health issue leading to abnormalities in bone metabolism. Deficiency in vitamin D is associated with many cancers (breast, colon, prostate), cardiovascular disease and autoimmune disorders.¹ Along with this mental health consequences of vitamin D deficiency are also evident. Depressive symptoms are also ascribed to insufficient vitamin D²⁻⁴, cognitive impairment⁵⁻⁷, and is also a risk factor

for schizophrenia⁸. Various medical problems¹ such as obesity, diabetes mellitus, and hypertension are also related with vitamin D deficiency, which are fairly common in patients with psychiatric illnesses.

There are various factors which leads to deficiency of vitamin D in person with psychiatric illness. Which can be due to poor diet or less exposure to sunlight or factors like medication, smoking or alcohol which interfere with formation

of vitamin from sunlight.^{9,10} US Endocrine Society practical guidelines states deficiency of vitamin D as serum 25-OH D <50 nmol/l or <20 ng/ml and insufficiency as 25-OH D between 50 to 75 nmol/l (21–29 ng/ml).¹

A study done on US population reported Vitamin D deficiency prevalence to be 37.5% in general population. Strong association was seen with various metabolic, neoplastic and immunological disorders.^{11,12}

There are studies showing Vitamin D has important role in maintaining mental health, human emotions along with cognitive functions.^{13,14}

Studies have shown relationships between vitamin D deficiency and depressive symptoms or cognitive impairment. Vitamin D deficiency is associated with various neurological disorders like multiple sclerosis, parkinson's disease, alzheimer's disease.¹⁵

One of the major causes for vitamin D deficiency in patients with mental health problems was low exposure to sunlight [limited outdoor exercise] and reduced vitamin D in food. darker skin people, are more prone to develop Vitamin D deficiency.

Methodology

We cross-sectionally evaluated the prevalence of deficiency of vitamin D among mentally ill patients.

The below mentioned information was collected from patients: socio-demographic variables, psychiatric diagnosis, serum levels of vitamin D and medical co-morbidities. For the study we collected informed consent from patients/ carer [if the patient is not in a condition to give consent].

To summarize descriptive statistics were used. Based on Vitamin D levels patients were segregated into three clusters : 1) Vit D deficiency if the levels were <10 ng/ml; 2) Vit D insufficiency if the levels were between 10–29.99 ng/ml; 3) Adequate vitamin D if the levels were \geq 30 ng/ml. The clusters were equated using chi-square tests for gender, age [<30 and >30 years],

and medical illness [DM, anaemia and hypothyroidism]. The level of significance was kept at $p < 0.05$.

Results

Our sample comprised of 46 patients, out of which 34 were males and 12 were females. Mean age was found 37.28 years. In study sample 60.9 % patients had psychotic illness whereas 39.1% had other psychiatric illness.

Table 1: Sociodemographic and clinical variables

Variables	Patients N=47 Mean (SD)/ Frequency (%)
Age in years	37.28 (11)
Gender	
Male	34 (73.9%)
Female	12 (26.1%)
Diagnosis	
Schizophrenia	16 (34.8%)
Psychosis unspecified	12 (26.1%)
Others	18 (39.1%)
Co-morbidity	
Yes	15 (32.6%)
No	31 (67.4%)

Out of 46 patients 33 (71.7%) patients had vitamin D levels below normal range, out of them 30.4% had vitamin D deficiency and 41.3% had vitamin D insufficiency. In our observation females were more deficient around 41.6% as compared to males (26.5%) but no significant correlation was found in vitamin D deficiency and gender. Also, it was observed that vitamin D deficiency was more in age group >30 years (33%) as compared to <30 years group (25%) but the difference was not significant. Also, it was seen that vitamin D was more deficient in patients with co-morbidities (66.6%) in comparison with patients without co-morbidities (12%) and the difference was statistically significant. Around 32% patient with psychotic illness were vit D deficient. All above findings are shown in Tables 1 to 6.

Table 2: Prevalence of vitamin D deficiency in study population

Vit D levels	Normal	Percent
Deficient	14	30.4%
Insufficient	19	41.3%
Normal	13	28.3%
Total	46	100%

Table 3: Distribution of Vit D deficiency and gender among study population

Vit D levels	Male		Female		P value
	N	%	N	%	
Deficient	09	26.5	05	41.7	0.129
Insufficient	17	50	02	16.7	
Normal	08	23.5	05	41.7	
Total	34	100	12	100	

Table 4: Distribution of Vit D deficiency and age [yrs] among study population

Vit D levels	Age < 30 yrs.		Age > 30 yrs.		P value
	N	%	N	%	
Deficient	04	25	10	33	0.677
Insufficient	08	50	11	36.7	
Normal	04	25	09	30	
Total	16	100	30	100	

Table 5: Distribution of Vit D deficiency and co morbidity

Vit D levels	Comorbidity				P value
	Yes		No		
	N	%	N	%	
Deficient	10	66.6	04	12.9	0.001**
Insufficient	03	20	16	51.6	
Normal	02	13.4	11	35.5	
Total	15	100	31	100	

Table 6: Psychiatric diagnosis and Vitamin deficiency

Vit D levels	Psychiatric diagnosis				P value
	Psychotic illness		Others		
	N	%	N	%	
Deficient	10	32.3	04	26.7	0.392
Insufficient	12	38.7	07	46.7	
Normal	09	29	04	26.6	
Total	31	100	15	100	

Discussion

We found higher prevalence of Vitamin D deficiency, with 33 out of 46 patients in our study group have inadequate vit D levels out of which 14 were deficient. Review article reported that community-based Indian studies done on apparently healthy controls reported a prevalence of Vitamin D levels ranged from 50%-60%. Compared to the general population in our observation vitamin D deficiency was higher in patients suffering from mental illness. Our results

are also comparable with other studies and indicate that Vitamin D deficiency are much more in patients of psychiatric illness as compared to the general population.^{16,17} It is also seen that it is more prevalent in higher age group and patients with comorbidities. Our study findings mainly emphasis on subjects with psychiatric illness and validate that they should be routinely screened for vitamin D deficiency in routine evaluation. We may think of giving vitamin D in routine to the

patient of mental illness which is more cost-effective.

One of the main reasons for improvement in psychiatric symptoms after supplementation are due to therapeutic benefits of Vitamin D. Vitamin D acts on neuronal receptors which are situated in brain regions that are concerned with human behaviour; it releases neurotrophin from cells which defends brain by anti-oxidant and anti-inflammatory defences.¹⁸

It is recognized that the major reason for vitamin D deficiency are less exposure to sunlight, poor dietary intake, substance use and sedentary life style.¹¹In literature it is seen that patients with severe mental illness smoke tobacco more than general population, run a sedentary lifestyle, and follows poor dietary intake.¹⁹ We also found high prevalence of VDID in age group >30 years, this suggest this group tend to less exposure to sunlight and poor dietary intake. They are also probably vulnerable group which requires due attention.

Like any other studies our study do have limitations. They are its being cross sectional study, varying psychiatric diagnosis and socio-demographic features.

Conclusion

Vitamin D deficiency is vastly prevalent in psychiatric patients and it is influenced by age, gender, physical activity and dietary patterns. It is also demonstrated high prevalence of medical comorbidity among vitamin D deficient population.

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