

Vitamin D Deficiency among Psychiatric Outpatients Attending Tertiary Hospital

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ABSTRACT

Introduction

Vitamin D deficiency is associated with various physical and mental illness. This study aimed to estimate the prevalence of vitamin D deficiency among patients with psychiatric illness who visited Psychiatry outpatient department of College of Medical Sciences and Teaching Hospital, Chitwan, Nepal and investigate association of vitamin D with clinical characteristics and psychiatric illness.

Methods

A total of 129 who attended Psychiatry OPD of College of Medical Sciences and Teaching Hospital were enrolled over a period of 4 months after taking informed written consent. Psychiatric diagnoses were established by attending psychiatrists as part of the routine assessment using ICD 10/DCR criteria. Serum vitamin D was assessed by standard method. Data was analyzed using SPSS.

Results

Among 129 participants, one hundred and seven patients (82.9%) showed vitamin D level below normal range. Thirty one (24%) had vitamin D deficiency, seventy six (58.9%) had vitamin D insufficiency and twenty two (17.1%) had normal vitamin D level. The mean level of vitamin D was 24.11 ± 10.19 . However, there was no significant association noted between vitamin D state and socio demographic profile and psychiatric illness.

Conclusions

We have found a high percentage of vitamin D deficiency among psychiatric patients in our study. Thus, screening for vitamin D deficiency should be considered as an important part of assessment of patients with major psychiatric illnesses.

Keywords: prevalence; psychiatric illness; vitamin D deficiency.

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INTRODUCTION

Vitamin D is recognized as the sunshine vitamin. It is considered necessary for essential biological functions such as bone and mineral metabolism, muscle function, psychological function and immunity. It is also involved in numerous brain processes, regulation of neurotrophic factors, neuroprotection, neuroplasticity and brain development. Lack of exposure to sunlight and insufficient dietary intake; individuals with darker skin are at higher risk of vitamin D deficiency.

Vitamin D deficiency has been identified as a global problem with an estimated one billion people worldwide suffering from vitamin D deficiency or insufficiency.¹ Studies conducted in south-east Asian region have shown people residing in these areas are prone to vitamin D deficiencies and its consequences.² It is evident that as much as 69-82% population in India had vitamin D under 20 ng per milliliter.³⁻⁵ In Nepal, there are few studies been done. The prevalence of vitamin D deficiency was 64% in a cross sectional study conducted in Alcohol use disorder inpatients in Kathmandu.⁶

Vitamin D deficiency has been associated with increased risk of common cancers, autoimmune diseases, hypertension and infectious diseases.⁷ In addition, insufficient vitamin D deficiency has also been linked to various psychiatric disorders as depression⁸, cognitive impairment⁹ and development of schizophrenia¹⁰.

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, which are the areas of brain responsible for depression, schizophrenia and other mood disorders.¹¹ Moreover, vitamin D activity is considered to be involved in modulation of hypothalamic- pituitary- adrenal axis which regulates production of neurotransmitters

epinephrine, norepinephrine and dopamine in adrenal cortex¹² and protects against depletion of dopamine and serotonin¹³.

Literature suggests that the risk of developing certain psychiatric disorders may be reduced by the prevention of vitamin D deficiency in early life or the treatment outcome may be improved by vitamin D supplementation.¹⁴

Thus, this study aimed to explore the extent of vitamin D deficiency in psychiatric outpatients and to find difference in extent of vitamin D deficiency across different disorders.

METHODS

This study was a hospital based-cross sectional descriptive study conducted in College of Medical Sciences and Teaching Hospital over a period of 4 months from September 2019 to December 2019. Psychiatric diagnoses were established by attending psychiatrists as a part of the routine assessment using ICD 10/DCR criteria. All patients who were aged 18 years to 65 years were enrolled after informed written consent. While, patients with co morbid medical illness were excluded. A total of 129 patients were included. Ethical clearance was obtained from the ethical committee of the institutional review board of College of Medical Sciences and Teaching Hospital.

Plasma vitamin D levels of serum samples of patients were analyzed in the laboratory, using Chemiluminescent immunoassay technology.

Vitamin D deficiency was defined as a serum 25(OH)D level of below 10 nmol/L, insufficiency was defined as a serum 25(OH)D level of 10 nmol/L or above but less than 30 nmol/L and vitamin D sufficiency was defined as a serum 25(OH)D level of 30 nmol/L or above.

Statistical analysis

The collected data were entered in Microsoft Excel, tabulated and analyzed using SPSS (23.0Version). Statistical analysis was done

using parametric and nonparametric statistical techniques for measure of central tendency, standard deviation and other test of significance as appropriate. The correlation between socio demographic profile, psychiatric illness and serum vitamin D level were analyzed using Pearson correlation. Statistical significance was assessed at 5% level of significance ($p < 0.05$).

RESULTS

The study consisted of 129 patients among which 34 (26.4%) were male and 95 (73.6%) were

female. The mean age was 37.7 years. Majority of patients were married 106 (82.2%), studied upto secondary level 43 (33.3%), belonged to middle socioeconomic condition 86 (66.7%), stayed in nuclear family 117 (90.7), followed Hinduism 122 (94.6%). Almost half of the patients 62 (48.1%) had a diagnosis of mood disorder of which 56 (43.4%) had Depressive disorder and 6 (4.7%) had Bipolar Affective Disorder. While 41 (31.8%) had Anxiety spectrum disorder, 9 (7%) had Schizophrenia and psychotic illness, 8

Table 1. Socio-demographic and clinical characteristics of study participants according to vitamin D level.

Variable		Total	Deficiency ≤10nmol/L	Insufficiency 10-30 nmol/L	Adequacy ≥30nmol/L	P value
N(%)		129	31(24)	76(58.9)	22(17.1)	-
Age (Years)		36.7±14.65	34.9±16.06	38.3±14.14	34±14.28	0.353
Gender	Male	34(26.4)	6(4.7)	19(14.7)	9(7)	0.196
	Female	95(73.6)	25(19.3)	57(44.2)	13(10.1)	
Religion	Hindu	122(94.6)	30(23.3)	72(55.8)	20(15.5)	0.007
	Buddhist	5(3.9)	0(0)	3(2.3)	2(1.6)	
	Muslim	2(1.6)	1(0.8)	1(0.8)	0(0)	
	Others	0(0)	0(0)	0(0)	0(0)	
Socioeconomic status	Upper	5(3.9)	2(1.6)	3(2.3)	0(0)	0.159
	Middle	86(66.7)	23(17.8)	48(37.2)	15(11.6)	
	Lower	38(29.5)	6(4.7)	25(19.37)	7(5.4)	
Family type	Nuclear	117(90.7)	28(21.7)	70(54.3)	19(14.7)	0.693
	Joint	12(9.3)	3(2.3)	6(4.7)	3(2.3)	
Marital status	Married	106(82.7)	25(19.4)	67(51.9)	14(10.9)	0.196
	Unmarried	23(17.8)	6(4.6)	9(7.0)	8(6.2)	
Employment	Business	7(5.4)	2(1.6)	4(3.1)	1(0.8)	0.652
	Farmer	3(2.3)	1(0.8)	0(0)	2(1.6)	
	Laborer	3(2.3)	0(0)	2(1.6)	1(0.8)	
	Service	17(13.2)	2(1.6)	13(10.1)	2(1.6)	
	Housewife	73(56.6)	17(13.2)	47(36.4)	9(7.0)	
	Student	22(17.1)	9(7.0)	7(5.4)	6(4.6)	
	Unemployed	4(3.1)	0(0)	3(2.3)	1(0.8)	
Education status	Illiterate	24(18.6)	4(3.1)	18(14)	2(1.6)	0.671
	Primary	5(3.9)	0	4(3.1)	1(0.8)	
	Secondary	43(33.3)	9(7.0)	25(19.4)	9(7.0)	
	SLC	1(0.8)	0(0)	0(0)	1(0.8)	
	Intermediate	36(28)	15(11.6)	18(14)	3(2.3)	
	Graduate	19(14.7)	3(2.3)	10(7.8)	6(4.7)	
	Others	1(0.8)	0(0)	1(0)	0(0)	

(6.2%) had Somatoform disorder, 3 (2.3%) had Alzheimer's dementia, Adjustment disorder and Alcohol dependence syndrome each.

Among 129 participants, 107 (82.9%) showed vitamin D level below normal range. Thirty one (24%) had vitamin D deficiency, seventy six (58.9%) had vitamin D insufficiency and twenty two (17.1%) had normal vitamin D level. The mean level of vitamin D was 24.11 ± 10.19 nmol/L.

There were no statistically significant association noted between vitamin D state and socio demographic profile and psychiatric illness. As shown in Table 2, individuals with a primary diagnosis of Bipolar affective disorder were noted to have the lowest mean serum vitamin D 18.83 ± 6.52 nmol/L, while those with Adjustment disorder had the highest mean serum vitamin D level of 32 ± 11.13 nmol/L.

Diagnosis	Mean \pm SD (nmol/L)	N
Alzheimer's dementia	19 ± 7	3
Alcohol Dependence Syndrome	28 ± 5.29	3
Schizophrenia and Psychotic illness	25.22 ± 11.85	9
Bipolar Affective Disorder	18.83 ± 6.52	6
Depressive Disorder	23.99 ± 10.14	56
Anxiety Spectrum Disorder	24.34 ± 11.54	41
Adjustment Disorder	32 ± 11.13	3
Somatoform Disorder	24 ± 3.33	8

DISCUSSION

Our study found a high percentage of patients with vitamin D below normal range, 82.9%. This finding is in concordance to the similar studies done across different parts of the world.¹⁵⁻¹⁷ In a study done among 290 patients with mental illness, prevalence of vitamin D deficiency was 31% and vitamin D insufficiency was 63%, which is similar to 24% deficiency and 58.9% insufficiency in our sample.¹⁵ The

reason for increased vitamin D deficiency among psychiatric patients could be due to poor diet, smoking, inadequate exercise and lack of exposure to sunlight, which has been reported in studies in patients with Schizophrenia¹⁸ and Bipolar affective disorder¹⁹.

Majority of patients evaluated had mood disorder 48.1% of which, 43.4% had Depressive disorder and 4.7% had Bipolar affective disorder. Our findings are in the line with similar studies.^{15, 20} Although the findings were not statistically significant, we found patients with bipolar affective disorder had the lowest mean vitamin D of 18.83 ± 6.52 nmol/L.

However our study did not show any significant association between socio demographic profile and vitamin D level.

Thus, screening of vitamin D level is an important part in management of patients with major psychiatric illness.

Our study had several limitations. The study was conducted in patients visiting one hospital so this limits generalizability of the results. Also, the relatively small sample size in our study is another limitation which demands requirement of further large studies to explore this.

CONCLUSIONS

We have found a high percentage of vitamin D deficiency among psychiatric patients in our study. Thus, screening for vitamin D deficiency should be considered as an important part of assessment of patients with major psychiatric illnesses.

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Conflict of Interest: None.

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