

ASSOCIATION OF SERUM 25-HYDROXY VITAMIN D LEVELS IN DERMATOLOGICAL DISORDERS WITH PSYCHIATRIC SYMPTOMS: A CROSS-SECTIONAL OBSERVATIONAL STUDY

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Abstract

Background: Vitamin D deficiency is increasing in the general population and is linked with physical and mental illness. However, evidence of its prevalence in dermatological disease patients with psychiatric symptoms is limited. The aim and objective is to investigate the association between serum 25(OH) D levels in dermatological patients with psychiatric symptoms. **Materials and Methods:** A cross-sectional observational study was conducted among 100 dermatological patients with psychiatric symptoms like depression, anxiety, social isolation, emotional stress, etc. participated in the study. Patients over 65 years of dermatological disorders with psychiatric symptoms suggestive of vitamin D deficiency were enrolled and included in the study. Serum 25(OH) D levels were measured by immuno chemiluminescence assay. Serum vitamin D was measured and classified into normal (>30 ng/ml), insufficient (20–30 ng/ml), and deficient (<20 ng/ml). **Result:** Among 100 participants with the dermatological disorder with psychiatric symptoms, 54% (N = 54) were male, and 46% (N= 46) were female, with a mean age of the patients of 36.7±14.5 years. The majority of the patients were diagnosed with generalized psoriasis (46%), followed by acne excoriée (18%), chronic eczema (13%), and vitiligo (8%). Regarding psychiatric symptoms, depression (42%) and anxiety (38%) were the most common symptoms associated with dermatological disorders. In this study, 54% (N = 54) of participants were vitamin D deficient (serum 25(OH)D <30 nmol/L), and a further 31% (N = 31) were vitamin D insufficient (<50 nmol/L); 15% (N = 15) of participants were vitamin D sufficient (>50 nmol/L). The mean serum vitamin D level among whole study subjects was 29.4±14.3 nmol/L. The mean serum 25(OH) D level was not found to be significantly different among all primary diagnoses (p>0.05). **Conclusion:** Higher prevalence of 25 (OH) D deficiencies among dermatological patients with psychiatric symptoms indicates a crucial role of vitamin D in the pathophysiological process of such diseases. Anxiety and depression-like psychiatric symptoms are more common among these patients. However, the inverse relationship of vitamin D levels among these patients warrants further investigation.

INTRODUCTION

Psychodermatology, a relatively neglected branch of dermatology in India, refers to a holistic approach to skin diseases involving the mind and skin and the cutaneous effects of psychological stress. The relationship between skin and the brain exists due to more than a fact that the brain, as the center of psychological functions, and the skin, have the exact ectodermal origin and are affected by the same

hormones and neurotransmitters.^[1] Emotional stress may exacerbate many chronic dermatoses and can initiate a vicious cycle called the "itch-scratch cycle"; therefore, treating recalcitrant patients with chronic dermatoses may be difficult without addressing stress an exacerbating factor.^[2]

Vitamin D deficiency is increasing in the general population and is linked with physical and mental illness. However, evidence of its prevalence in people with mental illness is limited. This study

investigated vitamin D deficiency in 100 adult patients enrolled in our hospital. In recent years, there has been a growing interest in the role played by vitamin D in skin disease.^[3] Imbalance of vitamin D level has been associated with skin disorders with psychiatric symptoms including psoriasis, vitiligo, alopecia areata, albinism, atopic dermatitis, acne, lichen planus, prurigo simplex, and chronic eczema,^[4,5] but the evidence was deemed speculative and inconclusive.

Despite the high prevalence and strong association of vitamin D deficiency in dermatological disorders with psychiatric symptoms, our country's true extent data is unavailable. This is important because the care of patients with skin disease may be inadequate if the vitamin D status is still being determined.

MATERIALS AND METHODS

This cross-sectional observational study was designed to estimate the prevalence of vitamin D deficiency in patients admitted to a dermatology department with psychiatric symptoms at a tertiary care teaching hospital. The duration of the study was 6 months. Adults (18–65 years of age) attending the out-patients department of general skin were included in the study based on the following criteria:

Inclusion Criteria

Patients between 18 and 65 years of either gender with dermatological disorders with psychiatric symptoms suggestive of vitamin D deficiency.

Exclusion Criteria

1. Pregnant and lactating women
2. Patients above 65 years
3. A patient who has taken vitamin D in the last 3 months
4. A patient suffering from thyroid disorders, parathyroid disorders, renal disorders, and metabolic disease
5. Patients on steroids and other factors influencing vitamin D.

Sample Size

100 patients (ages between 18 and 65 years) with dermatological disorders with psychiatric symptoms suggestive of vitamin D deficiency were randomly selected for the study duration of 6 months. Ethical approval was gained from the local Institutional

ethics committee. Written informed consent was taken from all the participants included in this study. One hundred patients were admitted to the general adult wards of the unit between 1st April 2022 and 30th Sep 2022 and were eligible for inclusion in the study.

Vitamin D levels and standard admission blood tests on serum samples collected by venepuncture were requested. Plasma vitamin D levels of serum samples were analyzed in the local pathology laboratory using Siemens Centaur XP analyzers with acridinium ester chemiluminescence technology.

Vitamin D deficiency was defined as a serum 25(OH)D level of below 30 nmol/L; insufficiency was defined as a serum 25(OH)D level of 30 nmol/L or above, but less than 50 nmol/L and vitamin D sufficiency was defined as a serum 25(OH)D level of 50 nmol/L or above.

Primary clinical diagnosis using ICD-10 criteria, gender, age, and psychiatric symptoms were subsequently obtained from participants' case record forms.

Data were initially input and analyzed using Microsoft Excel, and further descriptive analysis was conducted on IBM SPSS version 20. Quantitative variables were expressed as mean \pm standard deviation (Mean \pm SD) and numbers (percentages). As data were found to be normally distributed, parametric analysis was used throughout the analysis. A Chi-square test was used for categorical variables. P values less than 0.05 were considered statistically significant for all tests.

RESULTS

A total of 100 participants with the dermatological disorder with psychiatric symptoms were included in the study; 54% (N = 54) were male, and 46% (N= 46) were female. As shown in [Table 1], the mean age of the cohort was 36.7 \pm 14.5 years, and the median age was 33.5, ranging from 18 to 56. Among 100 patients, 61 patients were married, and 39 were unmarried. In most patients (76%), we found no overall work impairment conditioned by employment. Furthermore, 7% (n=7) of the patient population were students.

Table 1: Demographic characteristics of the population sample.

Age of patients	Years
Mean	36.7 \pm 14.5
Median	33.5
Range	56
Minimum	18
Maximum	60
Gender	Frequency (%)
Male	54%
Female	46%
Total	100

The majority of the patients with dermatological disorders with psychiatric symptoms were diagnosed with generalized psoriasis (46%), followed by acne (18%), chronic eczema (13%), and vitiligo (8%).

Regarding psychiatric illness, depression (42%) and anxiety (38%) were the most common symptoms presented with dermatological disorders. Other symptoms included anger (24%), social isolation (32%), suicidal ideation (5%), and feeling of stress (18%) in all study participants.

Table 2: Frequency distribution of dermatological disorders.

Dermatological disorder	Frequency (n)	Percentage (%)
Acne	18	18%
Vitiligo	8	8%
Alopecia areata	6	6%
Chronic eczema	13	13%
Generalized psoriasis	46	46%
Atopic dermatitis	6	3%
Lichen planus	3	3%
Prurigo simplex	0	0%

Table 3: Psychiatric symptoms in dermatological disorders.

Psychiatric symptoms	Percentage (%)
Depression	42%
Anxiety	38%
Suicidal ideation	05%
Feelings of stress	18%
Anger	24%
Social isolation	32%

The mean serum vitamin D level among study subjects was 29.4 ± 14.3 nmol/L with 30 nmol/L of median in the sample size. On the comparative assessment of mean serum Vitamin D level, no statistically significant difference was found among the male and female gender (30.4 nmol/L vs. 29.5 nmol/L). No statistically significant differences were noted in mean serum 25(OH)D associated with the primary diagnosis.

Table 4: Mean Vitamin D level among study participants

	Mean Vitamin D level+SD (nmol/L)	Frequency	SD
Whole sample			
Mean	29.4	100	14.3
Median	30		
Minimum	14.3		
Maximum	65		
Gender			
Male	30.4		11.4
Female	29.5		12.4
Dermatological disorders			
Acne	30.2	18	17.2
Vitiligo	28.5	8	15.4
Alopecia areata	27.1	6	8.3
Chronic eczema	31.3	13	12.5
Generalized psoriasis	23.5	46	18.5
Atopic dermatitis	32.3	6	10.2
Lichen planus	32.5	3	8.9

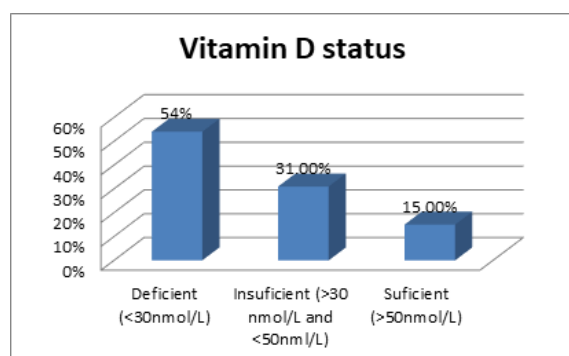


Figure 1: Percentage of participants found vitamin D deficient, insufficient, and sufficient (n = 100).

As shown in [Figure 1], 54% (N = 54) of participants were vitamin D deficient (serum 25(OH)D <30 nmol/L), and a further 31% (N = 31) were vitamin D insufficient (<50 nmol/L); 15% (N

= 15) of participants were vitamin D sufficient (>50 nmol/L).

DISCUSSION

To the best of our knowledge, here is the first study to assess the prevalence of vitamin D deficiency in dermatological patients with psychiatric symptoms enrolled at a place of admission to a general adult skin and venereal disease unit in India. We found a very high prevalence of vitamin D deficiency in dermatological patients with psychiatric symptoms admitted to our hospital, with 54% being deficient and 31% being insufficient in vitamin D.

In the present study, the mean age of dermatological patients with psychiatric illness was 36.7 ± 14.5 years. This was compared to the study reported by Mavrogiorgou et al. of 44.38 ± 16.8 years.^[6]

However, a study done in Tamil Nadu by Sekar et al. found the mean age was 37.43 ± 10.1 years.^[7] Another Indian study by Mahajan et al. on Vitiligo patients reported a mean age of 24.4 years,^[8] we have included dermatological patients with psychiatric symptoms of different diseases; the mean age difference reported among the study participants may vary from study to study.

We found that depression (42%), social isolation (32%), and anxiety (38%) were the most common psychiatric symptoms associated with dermatological disorders. As reported by previous studies, depression, and anxiety have been associated with acne.^[9] Social phobia affected 45.7% of high school patients with acne compared to 18.4% of patients in the control group.^[10] In an adolescent population, Galili et al. demonstrated that patients had a higher frequency of headaches, anxiety disorders, and impaired social adjustment skills than healthy controls.^[11] Patients report embarrassment due to the appearance of psoriasis and difficulty masking it. Social isolation often results, and activities such as swimming and other recreational activities are usually avoided.

Due to increased stress and societal pressures, patients with vitiligo often experience severe psychological problems, including anxiety, depression, social withdrawal, and suicidal ideation. Parents and families of children with vitiligo also experience psychosocial stress. In a survey of Chinese families, parents of children with vitiligo tended to be affected in terms of psychosocial health.^[12] Depression is a common disorder present in this population. In a study of Indian patients, 59% of vitiligo patients sampled were found to have depression.^[13] In the same study, vitiligo patients displayed higher overall DLQI scores than the control group.^[13]

In the present study, we found 54% (N = 54) of dermatological patients were vitamin D deficient (serum 25(OH)D <30 nmol/L), and 31% (N = 31) were vitamin D insufficient (<50 nmol/L). Many studies have reported the crucial role of Vitamin D in the pathophysiological process of psoriasis and found either a deficiency or insufficiency of serum vitamin D in psoriatic patients.^[14,15] Several case-control studies have shown an inverse Correlation of serum vitamin D with disease severity in psoriasis patients.^[16-18] However, a study by Wilson et al. reported no significant difference in serum 25(OH)D levels in subjects with or without psoriasis. This may be because serum vitamin D level varies with factors like dietary habits, exposure to sunlight, and race; therefore, various studies reported differences in the final interpretation and conclusive remarks. Vitamin D modulates or suppresses inflammation in psoriasis skin disease by multiple mechanisms and rectifies the abnormal epidermal function related to this condition.^[19]

We reported a significantly lower vitamin D level among acne patients with psychiatric symptoms. Similarly to our results, other studies have shown a

high prevalence of 25(OH)D deficiency in patients with acne compared to healthy controls.^[20,21] A similar finding was reported in a study by Yildizgören et al. in which patients with nodulocystic acne showed relatively low serum vitamin D levels.^[22] Few previous reports support the theory that vitamin D has an immune regulatory function in sebocytes, which supports the possible anti-inflammatory effects of vitamin D in acne patients.^[23,24]

We reported 28.5nmol/L of mean vitamin D level among Vitiligo patients with psychiatric symptoms. Similarly, a study by Mahmmoud et al. found that most vitiligo patients had lower vitamin D levels than the controls. On the other hand, studies by Ustun et al,^[25] and Karagüzel et al,^[26] showed no significant difference in serum vitamin D levels between patients and controls; they did not find any correlation between vitamin D deficiency either with age or affected surface areas. Moreover, Karagüzel et al. have reported a decrease in the size of the Vitiligo lesion patch after giving vitamin D supplements six months of treatment ($p < 0.001$), in contrast to an increase in lesion size in patients who received only topical therapy.^[26]

The association of psychiatric illness with vitamin D deficiency is frequently unrecognized and may be an important contributor to psychiatric symptoms in dermatological patients. Some studies also reported an association between vitamin D deficiency and cognitive impairment.^[27,28] Eskandari et al. showed that low vitamin D levels correlate with major depression.^[29] other studies also reported vitamin D deficiency and the presence of psychosis in adolescents.^[30] Various investigations found that individuals with schizophrenia had significantly lower blood vitamin D levels than the control groups.^[31] Similarly, few studies have shown the critical role of vitamin d among patients with albinism, alopecia areata, and chronic eczema.^[19,32,33]

CONCLUSION

In conclusion, we reported a higher prevalence of vitamin D deficiency among dermatological disorders with psychiatric symptoms like psoriasis, acne, vitiligo, atopic dermatitis, and chronic eczema, indicating a crucial role of vitamin D in the pathogenesis of such diseases. Anxiety, depression, stress, and social isolation, like psychiatric symptoms, are more common among these patients. However, further studies with large sample sizes and extensive evaluation criteria with disease severity, pathogenesis, and therapeutic response will provide the definite conclusive role of vitamin D in dermatological diseases with psychiatric symptoms.

Limitation

Our study has some limitations. First, we have not evaluated any factors which directly or indirectly influence the level of vitamin D in skin disorders

with psychiatric disease. Secondly, the small sample size was another limitation of our study. Lastly, we have yet to assess the therapeutic efficacy of vitamin D supplementation in such patients with 25(OH)D deficiency.

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