

Original Research Article

TO DETERMINE SOCIO-DEMOGRAPHIC AND CLINICAL CORRELATES OF VITAMIN D SERUM LEVELS IN PATIENTS OF ACNE VULGARIS IN A TERTIARY CARE HOSPITAL

¹Dr. Pritica Debnath Mathur, ²Dr. Rahul Mathur

¹Department of Dermatology, LNCT Medical College, Indore, Madhya Pradesh, India

²Department of Psychiatry, MGM Medical College, Indore, Madhya Pradesh, India

Corresponding Author:

Dr. Pritica Debnath Mathur (rahulmathurpsychiatry@gmail.com)

ABSTRACT

Objective: The objective was to assess serum vitamin D [25(OH)D] levels in patients with acne vulgaris and investigate the possibility of a relationship between low serum vitamin D levels and acne severity ordinary.

Materials and Methods: This study was an descriptive study at the department of Dermatology at a private medical college in Indore, Madhya Pradesh.

Results: This study analysed 65 cases. Of the 65 patients, 28 were male and 37 females. Of the 65 patients, 20 had mild acne and 31 patients had moderate acne. The number of subjects with severe and very severe acne was 9 and 5, respectively. Results Studies have shown no significant relationship between serum vitamin D concentrations and acne severity. We also couldn't establish significant correlation was found between serum vitamin D concentrations and patient sex.

Keywords: Acne, dermatology, skin treatment

Introduction

Acne vulgaris is a very common inflammatory disorder characterized by seborrhoea, the formation of open and closed comedones, erythematous papules and pustules and in more

severe cases nodules, deep pustules and pseudocysts. It impacts the pilosebaceous units. It is one of the most frequent dermatological conditions faced in dermatology ^[1]. The Greek word “acme” is the root word for acne which means “prime-life. It can present as a benign, self-limiting condition, but at times it may cause severe psychological upset or disfiguring scars leading to significant impact on quality of life of the patient ^[2]. It can manifest at any time during life but usually presents during the 2nd and 3rd decade (12-24) commonly initiating at pubertal onset, which estimates 85% of population affected ^[3]. There are various mechanisms proposed for acne however the precise mechanisms of acne are still under evaluation. The most accepted hypothesis proposes the following pathogenic factors ^[4].

1. Abnormal bacterial function.
2. Production of inflammation.
3. Increased sebum production.
4. Hyper cornification of pilosebaceous duct.

Vitamin D is a fat-soluble steroid hormone derived from dietary intake and it's synthesized through the skin via exposure to sunlight. Vitamin D₂ (ergocalciferol) and D₃ (cholecalciferol) are produced by solar ultraviolet B radiation. By the absorption of UVB irradiation in the skin there is change of provitamin D to pre-Vitamin D, post which the production of vitamin D₃ occurs ^[5]. Vitamin D has multiple functions in addition to its primary function of role as a Modulator of calcium metabolism and homeostasis. It impacts both the innate and Adaptive immune system by its interaction with T and B lymphocytes, dendritic cells, and macrophages ^[6, 7], also it has implications in systemic inflammatory diseases like rheumatoid arthritis, inflammatory bowel disease and systemic lupus erythematosus ^[8, 9]. Vit-D₃ plays a vital role as an immune modulator in psoriasis, vitiligo, atopic dermatitis, and alopecia ^[10-13]. The link between vitamin D level and Acne Vulgaris are widely being studied with various literature supporting this mechanism ^[14-17]. Recently, various skin conditions have been witnessed to have low levels of vitamin D ^[18]. Few studies have identified vitamin-D receptors to be present in sebocytes which line the sebaceous glands ^[19, 20], this finding further supports the hypothesis of a role of vitamin D in the acne etiogenesis. Only a few descriptive studies ^[14-17] have tried to establish the association between low vitamin D level and acne vulgaris. Thus, this study attempts to find a thread between the two entities and was aimed to determine the serum vitamin D [25 (OH) D] levels in patients of acne vulgaris and to investigate the possibility of an existing relationship between low serum vitamin D level and severity of acne vulgaris.

Methodology and Materials

The present study was performed in the department of Dermatology at a private medical college in Indore after taking ethical clearance from institutional ethics committee. The study duration was 6 months, and the period of data collection was between April 2017 to September 2017. The study was approved by the Institutional Scientific and Ethical committee. The sampling technique used was purposive type and the target population was all patients coming to dermatology OPD. Inclusion criteria was constructed which included both genders between age of 18 to 65 years with the diagnosis of acne vulgaris as per the global Acne grading system (GAGS) score. Severity of acne can be classified in four categories according to Global Acne Grading System (GAGS): Mild, moderate, severe and very severe.

Location of acne factors were

Factor 1: For nose and chin.

Factor 2: For forehead, right cheek and left cheek.

Factor 3: For chest and upper back.

Each type of lesion is given a value depending on severity: no lesions = 0, comedones = 1, papules = 2, pustules = 3 and nodules = 4. •The score for each area (Local score) is calculated using the formula: •Local score = Factor × Grade (0-4). The global score is the sum of local scores and acne severity is graded using the global score. 1-18, mild, • 19-30, moderate; • 31-38, severe and • >39, very severe. Pregnant, breastfeeding patients, subjects taking oral contraceptives, corticosteroids or any medication that affects vitamin D metabolism (Ketoconazole, Rifampin, Phenytoin, Isoniazid), patients on vitamin D supplementation, patients on multivitamins, patients are suffering from active malignancy or other chronic systemic diseases, patients on regular medication for other diseases, history of oral Isotretinoin over the last 3 months were exclusion criteria. Serum Vitamin D Analysis- For observation of serum concentrations of 25-hydroxyvitamin D₃ (25 (OH) D), blood samples were collected from veins and analyzed within 24 h of sampling. Levels of 25 (OH) D were categorized as adequate (> 20 ng/mL), inadequate (12-20 ng/mL) or deficient (<12 ng/mL) as per the clinical practice guidelines of biochemistry.

Statistical analyses were performed post data collection using appropriate tools. Continuous data would be summarized in the form of mean and standard deviation. Count data will be expressed in the form of proportion. The chi-square test was performed to compare the categorical data. The correlation between the serum vitamin D level and severity of acne was evaluated using Pearson's correlation analysis.

Results

Table 1: Gender Distribution

	Male	Female	Total
Frequency (%)	28 (43%)	37 (57%)	65 (100%)

Table 2: Age wise distribution of subjects

Age	Male	Female	Total
18-30	13	17	30
31-40	7	10	17
41-50	4	5	9
51-60	3	3	6
>60	1	2	3

Table 3: Employment wise distribution of subjects

Vocation	Male	Female	Total
School going	5	8	13
UG/PG	6	12	18
Employed	10	8	18
Unemployed	7	9	16

Table 4: Duration of acne in subjects

Duration	Male	Female	Total
<1 year	5	4	9
1-2 years	9	12	21
3-4 years	12	18	30
>4 years	2	3	5

Table 5: Severity of Acne in subjects

Severity	Male	Female	Total
Mild	10	10	20
Moderate	12	19	31
Severe	3	6	9
Very Severe	3	2	5

Table 6: Mean Serum Concentration of Vit-D

Value	Male	Female	P value
Mean serum Vit-D value (ng/ml)	25.7	24.3	0.278

Table 7: Mean Serum Concentration of Vit D as per Severity of Acne

Parameter	Mild acne	Mod. acne	Sev. acne	Very Sev. Acne	P value
Mean serum Vit-D value (ng/ml)	28.2	24.7	25.3	24.8	0.136

This study included 65 patients with acne vulgaris (37 females and 28 males). Baseline demographics and clinical characteristics of the participants are presented in (Table 1). We found that the maximum number of patients belonged to the age group 18-30 years with 30 patients, followed by 31-40 years with 17 patients. (Table 2). Most of the study subjects (31) were school going or college student, while those who were in vocation were 18. (Table 3) 35 patients had duration of lesions between 3-4 year, 18 patients had Duration between 1-2 years. (Table 4) Out of 65 patients 20 had mild acne and 31 patients had moderate acne. No of subjects having severe and very severe acne were 9 and 5 respectively (Table 5). We were not able to establish any significant correlation between serum concentrations of vitamin D and gender of patients. (P-value 0.278) (Table 6). The results of the study showed that there were no significant relationship between the serum concentration of vitamin D and severity of acne (mild, moderate and severe) (P-value = 0.136) (Table 7).

Discussion

Various bio-chemical methods are present by which vitamin D induces its anti-inflammatory effects. These mechanisms support the theory of the immune-regulatory function of vitamin D and the anti-inflammatory effects of it in acne patients. Vitamin D inhibits *Propionibacterium* acne-induced Th 17 differentiation. Indeed, reducing the expression of IL 17 is an inflammatory cytokine that found to be increased in acne Patients [20]. Vitamin D also reduces the expression of inflammatory cytokines in cultured sebocytes such as interleukin IL-6, IL-8 and matrix metalloproteinase 9 [21]. Various other mechanisms could be exerting antimicrobial effects by inducing antimicrobial peptides such as LL-37 in human sebocytes [22]. As the study tried to analyse vitamin D status in patients with acne, this could be attributed to subjects lack of exposure to sun and outside owing to their acne and fear of its exacerbation. This could be a probable mechanism of vitamin-D deficiency in patients with acne vulgaris. These results were consistent with Lim *et al.* who revealed that lower level of serum vitamin D in severe acne vulgaris patients might be due to psychological stress [16]. Al-Taiar *et al.* who shed light on the deficiency of vitamin D among adolescents, despite abundant sunshine in the Arabian Gulf [26]. Same results obtained in another study in Egypt by Elmohsen *et al.* They found no significant relationship between sun exposure and improvement of serum vitamin D levels [27]. Our results indicated that serum concentrations of vitamin D in acne patients were not significantly low. These results were in line with several other studies found that no significant deficiency of serum vitamin D levels in acne patients [15, 16, 23]. Among our patients, we found no significant association between vitamin D deficiency and gender of patients (P-value = 0.278). Our results are similar to those in several Studies [15, 16, 27, 28]. The results of the current study indicated that the mean value of vitamin D was a little higher in mild acne (28.2 ± 5.6) than in severe and very severe acne (25.3 ± 4.7 , 24.8 ± 5.2). However, this difference was not statistically significant (P-value = 0.136), and this can be explained by the small sample size of our study. Also, we found no significant relationship between vitamin D deficiency and the severity of acne vulgaris. This result concurs with various studies [23, 29]. To understand the vitamin D status associated with acne patients, we reviewed the factors that influence vitamin D deficiency. according to some authors obesity, decreased sun exposure and using sunscreen might be associated with low 25 (OH)D levels [30-34], but they were not evaluated for vitamin D deficiency in our research. The serum vitamin D level could also be influenced by food which contained fish oil or pork [35, 36] which is a caveat, however, to moderate the dietary patterns of the patients is difficult.

Conclusion

Through this research we were not able to establish any statistically significant low serum vitamin D levels in patients with acne vulgaris. This helps us to understand the necessity of screening patients for vitamin D insufficiency and Deficiency in acne patients. Future research with a more diverse sample and a bigger sample size is warranted to emphasize the role of vitamin D in acne vulgaris and to establish whether treatment of acne with both topical vitamin D and vitamin D supplementation would be beneficial.

Conflict of interest: None declared.

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