



SERUM CONCENTRATION OF VITAMIN D IN ACNE - A HOSPITAL BASED OBSERVATIONAL STUDY IN A HILLY STATE OF NORTH EAST

Dr. Subrata Kumar Das*

Senior Resident Doctor, Department of Dermatology, Sikkim Manipal Institute Of Medical sciences, Gangtok, Sikkim. *Corresponding Author

Dr. Saptadipa Das

Senior Resident Doctor, Department of Medicine, Sikkim Manipal Institute of Medical Sciences, Gangtok, Sikkim.

ABSTRACT

Objective- The aim was to evaluate serum level of vitamin D [25(OH)D] 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.

Material And Methods- This study was a hospital based observational study conducted on Outpatient Dermatology Clinics at Sikkim Manipal Institute Of Medical Sciences, Gangtok, Sikkim.

Results- 40 cases were analysed in this study. Among 40 patients, 23 were males and 17 were females. Out of 40 patients 14 had mild acne and 18 patients had moderate acne. No of subjects having severe and very severe acne were 5 and 3 respectively. The results of the study showed that there were no significant relationship between serum concentrations of vitamin D and severity of acne. Also, we did not find any significant correlation between serum vitamin D concentrations and gender of patients.

KEYWORDS : Acne , vitamin D , observational study, hospital

INTRODUCTION-

Acne vulgaris is a inflammatory disorder of the pilosebaceous units 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 is the most common disorder encounter in day to day practice by dermatologists¹. The term acne is derived from Greek word "acme" which means "prime of life". Although generally considered to be a benign, self limiting condition, but it may sometime cause severe psychological upset or disfiguring scars². It can manifest at any time during life but usually present between ages of 12-24, which estimates 85% of population affected³. The precise mechanisms of acne are not known but there are four major pathogenic factors⁴:

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

Vitamin D is a fat- soluble steroid hormone derived from dietary intake and its synthesized through the skin via exposure to sunlight. Vitamin D3 (cholecalciferol) and vitamin D2 (ergocalciferol) are manufactured through solar ultraviolet B radiation.

Absorption of UVB irradiation in the skin leads to conversion of provitamin D to pre- Vitamin D, followed by the production of vitamin D3⁵.

Vitamin D has a number of functions in addition to its well – known role as a Modulator of calcium metabolism and homeostasis . It affects both the innate and Adaptive immune system through its effect on T and B lymphocytes , dendritic cells , and macrophages^{6,7}, and it is associated with systemic inflammatory diseases such as rheumatoid arthritis , systemic lupus erythematosus , and inflammatory bowel disease^{8,9}.

It plays an important role as an immune modulator in atopic dermatitis , psoriasis , Vitiligo , and alopecia^{10,11,12,13}. The link between vitamin D level and AV has attracted attention recently with anecdotal evidence from few case- control studies^{14,15,16,17}. Recently , low levels of vitamin D have Been noticed in various skin conditions¹⁸. Furthermore , studies have identified vitamin D receptors in sebocytes^{19,20}, the cells lining sebaceous glands , which suggests a role of vitamin D in the acne Pathophysiology . Only a few epidemiological studies have investigated the association between low vitamin D level and AV^{14,15,16,17}.

AIM AND OBJECTIVES-

The aim was to evaluate serum level of vitamin D [25 (OH) D] 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 .

MATERIALS AND METHODS –

The study was conducted in Outpatient Dermatology Clinics at Sikkim Manipal Institute Of Medical Sciences , Gangtok , Sikkim , in the period between August 2019 and January 2020 . It was approved by the Institutional Ethical committee.

Inclusion Criteria-

Male and female patients with the diagnosis of acne vulgaris according to the global Acne grading system (GAGS) score .

Exclusion Criteria-

1. Pregnant,
2. Breastfeeding,
3. Patients on oral contraceptive pills,
4. Postmenopausal,
5. Patients on corticosteroids , or any medication that affects vitamin D metabolism (Ketoconazole , Rifampin, Phenytoin , Isoniazid) .
6. Patients on vitamin D supplementation , patients on multivitamins ,
7. Patients are suffering from active malignancy or other chronic systemic diseases , patients on regular medication for other diseases , and
8. History of oral Isotretinoin over the last 3 months .

Statistical Analysis-

Statistical analyses were performed using SPSS version 23. 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.

Clinical Assessment-

Severity of acne can be classified in four categories according to Global Acne Grading System (GAGS) :

- 1) Mild
- 2) Moderate
- 3) Severe
- 4) Very severe

Factors according to location of acne

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

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) according to the guidelines set by the Food and Nutrition Board of the Institute of Medicine ¹⁶ .

RESULTS-

This study included 40 patients with acne vulgaris (23 females and 17 males). Baseline demographics and clinical characteristics of the participants are presented in (Table 1). In the present study maximum number of patients belonged to the age group 16-20 years with 19 patients , followed by 21-25 years with 14 patients. (table 2) Most of the study subjects , 18 were college student , and no of employee were 12 . (table 3) 20 patients had duration of lesions between 3-4 year , 11 patients had Duration between 1-2 years. (table 4) Out of 40 patients 14 had mild acne and 18 patients had moderate acne. No of subjects having severe and very severe acne were 5 and 3 respectively (table 5).

We did not find any significant correlation between serum concentrations of vitamin D and gender of patients . (P - value 0.129) (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 = 0.145) (table 7) .

Table 1 Distribution Of Subjects According To Gender

	Male	Female	Total
No	23	17	40
%	57.5	42.5	100

Table 2 Distribution Of Subjects According To Their Age

Age Distribution	Male	Female	Total
10-15 Year	1	2	3
16-20 Year	12	7	19
21-25 Year	8	6	14
26-30 Year	2	2	4
Grand Total	23	17	40

Table 3 Occupational Status Of Study Subjects

Occupation	Male	Female	Total
School Student	2	2	4
College Student	10	8	18
Employee	7	5	12
Others	4	2	6
Grand Total	23	17	40

Table 4 Distribution Of Subjects According To Duration Of Disease

Duration	Male	Female	Total
< 1 Year	3	2	5
1-2 Year	5	6	11
3-4 Year	12	8	20
>4 Year	3	1	4
Grand Total	23	17	40

Table 5 Distribution Of Subjects According To Severity-

Severity Of Acne	Male	Female	Total
Mild	5	9	14
Moderate	14	4	18
Severe	2	3	5
Very severe	2	1	3
Grand total	23	17	40

Table 6 Mean Serum Concentration Of Vit D According To Gender-

Parameters	Male	Female	P value
Mean serum vitamin D level (ng/mL)	26.60	25.29	0.129

Table 7 Mean Serum Concentration Of Vit D According To Severity Of Acne-

	Severity of acne				P value
	Mild acne	Moderate acne	Severe acne	Very severe Acne	

Mean serum vitamin D level (ng/mL)	26.42	25.44	24.4	30.6	0.145
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DISCUSSION-

There are several biological mechanisms 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 . Other mechanisms are exerting antimicrobial effects by inducing antimicrobial peptides such as LL - 37 in human sebocytes ²² .

Since the aim was to analyze vitamin D status in patients with acne , this can be explained by several factors , such as the impact of psychological distress on their avoidance of spending extended periods outdoors . This suggests a possible explanation of low vitamin D levels 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 - Tair 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 (P - value = 0.003) . 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 = 0.199) . 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 (31.4±6.9) than in severe acne. (26±9.4 and 28.4±6.7, respectively). However, this difference was not statistically significant (P - value = 0.067) , 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 is in line with several studies ^{25,29} .

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 ^{30,31,32,33,34} , but they were not evaluated for vitamin D deficiency in this study . The serum vitamin D level is also influenced by food such as fish oil or pork ^{35,36} , unfortunately , however , we were unable to evaluate the dietary habits of the patients.

CONCLUSION-

This study did not reveal any statistical significant low serum vitamin D levels in patients with acne vulgaris . This highlights the importance of screening patients with acne for vitamin D insufficiency and deficiency . Further clinical trials on a larger scale are needed to address the importance of vitamin D in acne vulgaris and to determine whether treatment of acne with both topical vitamin D analogs and vitamin D supplementation is of significant effect.

Declaration Of Patients Consent-

The authors certify that they have obtained written informed consent from all the patients in the form patient (s) / attendants has / have given his / her / their consent for his / her / their images and other clinical information to be reported in the journal . The patients understood that their names and initials will not be published and due efforts will be made to conceal their identity , but anonymity can not be guaranteed.

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Conflicts Of Interest – There are no conflicts of interest .

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