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Original Research Paper

Dermatology

TO STUDY ASSOCIATION OF 25-HYDROXYVITAMIN D LEVELS IN PATIENTS WITH PSORIASIS VULGARIS IN A TERTIARY CARE CENTER– AN OBSERVATIONAL STUDY

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ABSTRACT Psoriasis is a chronic skin disorder, with a prevalence of 2-3% in the general population. Topical vitamin D derivatives are being used in its treatment. Vitamin D deficiency is defined as serum 25-hydroxyvitamin D < 20 ng/ml. The aim and objectives of study are to study association of 25-hydroxyvitamin D levels in patients with psoriasis vulgaris and to correlate demographical features, psoriasis disease duration, severity, and other disease characteristics with 25-hydroxyvitamin D levels. Study of 50 consecutive patients of psoriasis vulgaris was carried out for a duration of 12 months. Patient demographics, history, disease characteristics, and serum 25-hydroxyvitamin D levels were noted. The overall prevalence of vitamin D deficiency in study subjects was 52%. There was no correlation between vitamin D levels and duration of disease, body surface area and psoriasis area severity index.

KEYWORDS : Psoriasis, 25-hydroxyvitamin D, Psoriasis area severity index

INTRODUCTION:

Psoriasis is a chronic debilitating skin disease affecting millions of people worldwide, with a prevalence of 2-3% in the general population [1]. It is recognized as a T cell (both Th1 and Th17) mediated inflammatory disorder with hyperp roliferation of epidermal keratinocytes in genetically predisposed individuals [2]. Vitamin D has gained attention in the past few decades with studies demonstrating the varied functions of vitamin D in the body other than its role in bone and mineral metabolism. Through vitamin D receptor (VDR), 1,25-dihydroxyvitamin D3 has shown to inhibit the proliferation and to induce terminal differentiation of cultured human keratinocytes [3]. It also has an influence on immune functions of dendritic cells and T lymphocytes. In the context of psoriasis, topical vitamin D derivatives (calcipotriol, calcitriol and tacalcitol) are being extensively used as monotherapy or in combination with topical steroids. Also, narrowband ultraviolet (NB-UVB) phototherapy mediates its beneficial effect on psoriasis by increasing endogenous vitamin D levels. Vitamin D deficiency is defined as Serum 25-Hydroxyvitamin D < 20 ng/mL, insufficiency as 20– 29 ng/mL and sufficiency as ≥ 30 ng/mL, as per definitions of Endocrine Society [USA] [4]. In this study, we have tried to find out the association between serum 25- hydroxyvitamin D levels and psoriasis vulgaris and also correlate the psoriasis disease duration and severity with vitamin D levels.

AIMS AND OBJECTIVES:

The aim of the study is to study the association of 25-hydroxyvitamin D levels in patients with psoriasis vulgaris in a tertiary care center. The objectives are to correlate the psoriasis disease duration and severity with 25- hydro xyvitamin D levels and to correlate the demographics and other disease characteristics of patients with psoriasis vulgaris with 25- hydroxyvitamin D levels.

MATERIALS AND METHODS:

This was an observational, descriptive study carried out in Skin and V.D. Department of MIMER Medical College, Talegaon [Dabhade]. The study was approved by Institutional Ethics Committee. Cost involved for serum Vitamin D level estimation was obtained from the research grants of the institute. Study duration was of 12 months [January 2022 to December 2022]. A total of 50 consecutive patients of psoriasis vulgaris, with age ≥18 years and <70 years, attending the Skin &V.D. Department were studied. Exclusion criteria for the study were psoriasis patients in remission (without skin lesions); patients receiving oral vitamin D therapy (past or present), topical vitamin D or phototherapy or systemic therapy for psoriasis in the last 3 months; other clinical forms of psoriasis like erythrodermic psoriasis, pustular psoriasis; presence of other chronic inflammatory diseases and autoimmune disorders such as vitiligo, immuno-bullous disorders, multiple sclerosis, inflammatory bowel disease, rheumatoid arthritis, lupus erythematosus, cutaneous lymphoma, hepatic or renal disorders, gastrointestinal malabsorption diseases, thyroid disorders, non-melanoma skin cancer or any other cancer; patient on medications like anticonvulsants, corticosteroids, oral contraceptives, bisphosphonates and pregnant and lactating females.

Diagnosis of psoriasis was made based on the clinical features. All cases who fulfilled the inclusion and exclusion criteria, were enrolled into the study, after obtaining informed consent. Demographic details like age, sex, occupation, locality, socioeconomic status was noted. Average

sun-exposure in a week, type of clothing, use of sunscreen was enquired. History pertaining to psoriasis, its duration, age of onset, family history, history of any known comorbidities and any addictions was noted. Detailed general, systemic and cutaneous examination of cases was done.

Psoriasis disease severity was documented in terms of Body Surface Area [BSA] and Psoriasis Area Severity Index [PASI]. PASI is a useful tool in monitoring the response of psoriasis to any therapeutic regimen. Four sites of affection, viz. Head (h), Upper limb (u), Trunk (t), and Lower limbs (l) are separately scored. Morphologic scoring of psoriasis plaques is done by evaluation of three parameters viz. Erythema [E], Induration [I] and Desquamation [D], each of which have a severity scale of 0 to 4 (0: nil, 1: mild, 2: moderate, 3: severe, and 4: very severe). Then the area-wise percentage involvement is multiplied by prior calculated scores for each site (1: less than 10% area, 2: 10–29%, 3: 30–49%, 4: 50–69%, 5: 70–89% and 6: 90% or more are involved in psoriasis). Since head, upper limbs, trunk, and lower limbs denote 10%, 20%, 30% and 40% of the body surface area separately, they are given matching

weightage in scoring by multiplying their scores by 0.1, 0.2, 0.3, 0.4 respectively. Hence the final formula for calculating PASI is: PASI = 0.1(Eh + Ih + Dh)Ah + 0.2(Eu + Iu + Du)Au +0.3(Et + It + Dt)At + 0.4(El + Il + Dl)Al. The PASI score is delicate and mirrors improvement or worsening of disease. PASI Score can vary between 0 and 72 in steps of 0.1.

03 ml of venous blood sample was drawn from each of the cases, collected in red top vacutainer and sent for estimation of levels of serum 25-hydroxyvitamin D levels, which was measured using chemiluminescence immunoassay [CLIA] technique.

Data was tabulated and analyzed accordingly using SPSS Software 27.0. Pearson's correlation coefficient [r] was used for correlation of continuous variables.

OBSERVATIONS AND RESULTS:

Patient characteristics:

Mean age of patients was 46.76 ± 15.78 years, with minimum age as 18 years and maximum as 69 years. Patients were grouped according to age as 18-30 years [9 cases], 30-40 years [11 cases], 40-50 years [8 cases],50-60 years [5 cases] and 60-70 years [17 cases]. Majority of cases were in age group of 60-70 years [17 cases].

Out of 50 cases, 39 were males [78%] and 11 were females [22%] **[Figure 1]**. Male to female ratio was 3.5:1.

Majority of cases belonged to semiurban areas [28 patients, 56%] followed by rural [14 cases,28%], followed by urban [8 cases,16%] as per locality. 38 cases [76%] had indoor occupation.

Clothing pattern when patients were outdoors was asked, area of photo-exposed skin was noted and described as two categories: minimal [where only face, hands and feet are photo-exposed, maximum covered body] and moderate [where face and most of the upper limbs and feet is photo-exposed]. 47 cases [94%] were under moderate category and 3 cases [6%] under minimal category. Majority of cases [48 cases, 96%] did not use a sunscreen.

40 cases [80%] had Fitzpatrick type IV skin, rest 10 cases [20%] had Fitzpatrick type V skin.

Psoriasis disease characteristics:

As per age at onset of psoriasis, cases were divided as Type I Psoriasis [age at onset< 40 years] and Type II Psoriasis [age at onset> 40 years]. The distribution of Type I [24 cases, 48%] and Type II psoriasis [26 cases, 52%] was nearly equal. Mean age at onset was 43.38 ± 16.32 years with minimum age as 13 years and maximum as 69 years.

Mean duration of disease was 3.47 ± 4.0 years, with minimum duration as 1 month and maximum as 16 years.

Majority of patients of Psoriasis had winter exacerbation [28 cases, 56%], 2 patients [4%] gave history of summer exacerbation and 20 cases [40%] did not give any such history. Only 4 cases [8%] had family history of psoriasis, all of the 4 cases were of Type I psoriasis. Rest 46 cases [92%] had no family history of psoriasis.

As per total body surface area [BSA] involved in psoriasis [Rule of nine], patients were categorised as having mild [< 3%], moderate [3-10%] and severe [>10%]. Twenty-four cases [48%] had moderate BSA involvement, followed by 15 cases [30%] with mild BSA involvement and 11 cases [22%] with severe BSA involvement. Mean BSA involved was 13.25 ±17.69% [Range: 2% to 75%]. As per Psoriasis Area Severity Index [PASI] score calculated, patients were divided into mild [PASI score <7], moderate [PASI score 7-12] and severe [PASI score>12]. Twenty-eight cases [56%] had severe PASI score, followed by 14 cases which had mild PASI score [28%], and 8 cases [16%] with moderate PASI score. Mean PASI score calculated was 14.07± 10.21[Range: 1.4 to 44.9].

Serum Vitamin D levels and its correlation with various parameters:

Serum 25-hydroxyvitamin D levels were estimated and correlation with various parameters was done accordingly. Patients were categorised as deficient [< 20 ng/ml], insufficient [20-29 ng/ml] and sufficient [≥30 ng/ml]. Out of 50 cases, 26 cases [52%] were Vitamin D deficient, followed by 16 cases [32%] which were Vitamin D insufficient and 8 cases [16%] had sufficient Vitamin D levels **[Figure 2].**

Hypovitaminosis D, i.e., deficiency and insufficiency both together, was observed in 42 cases [84%]. Mean serum Vitamin D levels were 23.08 ±11.13 ng/ml [range :8.16 to 58.88 ng/ml].

Out of 39 males, 18 had vitamin D deficiency and out of 11 females, 8 cases had deficiency **[Table 1]**. Mean serum vitamin D levels in males was 24.23±10.93 ng/ml and in females was 18.99 ±11.37 ng/ml. Mean serum vitamin D levels were lower in females.

The mean serum vitamin D levels were also correlated with other parameters like locality, skin type, area of photo-exposed skin and occupation, and following conclusions were drawn as depicted in **Table 2**.

Correlation of serum vitamin D levels with age of cases, age at onset, sun exposure [hours/week], duration of disease, Body Surface Area [BSA] and Psoriasis Area Severity Index [PASI] was done with the help of Pearson's coefficient of correlation[r].

The age of cases, age at onset, sun-exposure had very weakly positive correlation with serum vitamin D levels. The duration of disease, Body Surface Area [BSA] and Psoriasis Area Severity Index[PASI] score had no correlation with serum vitamin D levels **[Figure 3 and 4]**, as per the correlation co-efficient[r] calculated, depicted in **Table 3**.

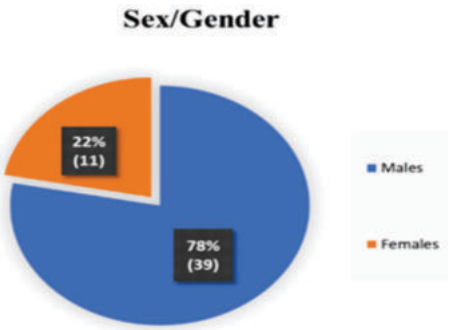

Figure 1: Sex distribution:

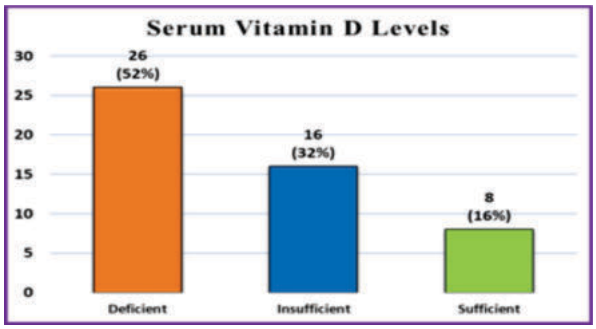

Figure 2: Serum Vitamin D levels:

Table 1: Serum Vitamin D levels in males and females:

Variable	Vitamin D deficiency [<20 ng/ml]	No Vitamin D deficiency [≥20 ng/ml]	Total
Males	18	21	39
Females	08	03	11
Total	26	24	**50**

Table 2: Mean serum vitamin D levels according to locality, skin type, area of photo-exposed skin and type of occupation and conclusion:

Variable	Mean Vit D levels	Conclusion
LOCALITY :		
Semiurban	23.24 ± 12.66	Mean Serum Vit D levels were lower in cases from urban area
Rural	25.45 ± 8.92	
Urban	18.37 ± 7.98	
SKIN TYPE :		
Type IV	22.44 ± 10.71	Mean Serum Vit D levels were lower in cases with Type IV skin
Type V	25.63 ± 12.95	
AREA OF PHOTOEXPOSED SKIN :		
Minimal	13.87 ± 1.71	Mean Serum Vit D levels were lower in cases with minimal area of photo-exposed skin
Moderate	23.67± 11.22	
TYPE OF OCCUPATION :		
Indoor	21.74 ± 10.21	Mean Serum Vit D levels were lower in cases with indoor occupation
Outdoor	24.43 ± 13.21	

Table 3: Correlation of vitamin D with various disease variables:

Variables	Correlation with Vitamin D levels (r =)	Level of correlation
Age of cases	0.1049	Very Weakly Positive
Age of onset	0.1034	Very Weakly Positive
Sun-exposure [hrs/week]	0.1177	Very Weak positive
Duration of disease	**-0.0136**	**No correlation**
Body Surface Area [BSA]	**0.0819**	**No correlation**
Psoriasis Area Severity Index [PASI]	**0.0870**	**No correlation**

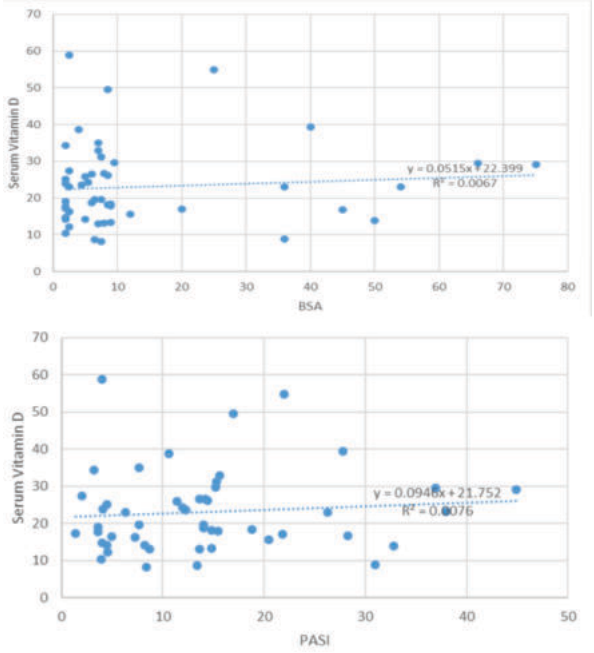

Figure 3 and 4: Correlation of serum Vitamin D with BSA and PASI

DISCUSSION:

Vitamin D inhibits keratinocyte proliferation and promotes their differentiation. It modulates expression of keratin K1/K10 within the stratum spinosum, where the expression of these keratins is altered in psoriasis. It also mediates suppression of IL-17, a key cytokine in pathogenesis of psoriasis. Vitamin D facilitates the shift from Th1 to Th2 phenotype response and induces regulatory T cells. It also has effects on monocytes by decreasing production of cytokines IL-1,6,8,12 and TNF-□. It also inhibits dendritic cell differentiation and maturation.

We had found in our study that, majority of patients were males [M:F=3.5:1]. The distribution of Type I and Type II psoriasis was nearly equal. All cases with family history were early onset Psoriasis [Type I]. Majority of patients had winter exacerbation. Majority of patients had Moderate BSA involvement [3-10%] and severe PASI score [>12]. Majority females in the study were Vitamin D deficient [< 20ng/ml]. All patients with minimal photo-exposed area i.e. more covered type of clothing were Vitamin D deficient. Mean Serum Vit D levels were lower in cases from urban area and in cases with indoor occupation.

Mean serum Vitamin D levels of patients in our study were 23.08 ±11.13 ng/ml. Gupta and Garg et al [5] in their study, reported mean levels as 22.86 ±11.38 ng/ml. GH Bhat and MS Khan [6] et al, Mohta and Nyati et al [7] had mean levels in cases as 28.3 ±13.9 ng/ml and 15.6 ± 7.7 ng/ml respectively. The overall prevalence of vitamin D deficiency [< 20ng/ml] in our study was 52%. Prevalence of vitamin D deficiency in studies by Gupta and Garg et al [5], GH Bhat and MS Khan [6], Mohta and Nyati et al [7] were 52%, 60% and 42% respectively.

PASI is a tool to measure extent and severity of disease in psoriasis. In this study, we did not find a significant correlation between serum vitamin D levels and PASI score. Also, no correlation was noted with duration of the disease. Previous studies by GH Bhat and MS Khan et al [6], and Mohta & Nyati et al [7], showed a negative correlation of serum vitamin D and PASI & duration of disease. Patil and Deo et al [8], reported lack of correlation of serum Vitamin D levels with PASI score and duration of disease, similar to our study.

CONCLUSION:

The overall prevalence of vitamin D deficiency [< 20ng/ml] in the study subjects was 52%. Prevalence of Vitamin D deficiency/insufficiency in normal population in India ranges from 40-99%, with most of the studies reporting prevalence of 80-90% [9]. Vitamin D deficiency is very prevalent in India. Comparison of prevalence of Vitamin D deficiency of our study [52%] could not be done with other studies or control.

There was no correlation between vitamin D levels and duration of disease, Body surface area [BSA] and Psoriasis area severity index [PASI].

Limitations of the study were that the study had a small sample size, no control group was taken. Vitamin D level deficiency has been linked to other diseases [10] like cardiovascular diseases, infections, bone and muscle diseases, metabolic disorders, allergic disorders, autoimmune diseases, cancer and other skin conditions like atopic dermatitis, vitiligo, alopecia areata, ichthyosis ,etc., if coexistent were not taken into consideration.

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