



Original Research Article

Correlation of psoriasis and serum vitamin D

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ABSTRACT

Background: Psoriasis is an immuno-mediated chronic systemic disease involving cytokines of helper Th1 pathway. Vitamin D has an effect on keratinocyte proliferation, differentiation and immune modulation of immune system especially Th1 pathway, which is altered in psoriatic skin suggesting that Vitamin D may have a role in pathogenesis of psoriasis.

Aim: To study correlation between psoriasis vulgaris and serum vitamin D.

Objective: To evaluate serum vitamin D level in psoriasis cases and in control group and correlating vitamin D level with severity and duration of the psoriasis.

Materials and Methods: 57 cases (>15years of age) with psoriasis and 57 healthy subjects were recruited. Psoriasis was clinically diagnosed and severity evaluated by PASI scale. Vitamin D was analysed by enhanced chemiluminescence on vitrus Eci autoanalyzer of Orth clinical diagnostic. Vitamin D deficiency defined as <20ng/ml, insufficiency 20-30ng/ml and sufficient 30-100ng/ml.

Results: Vitamin D deficiency in the study was 22.8% in patients and 14% in control group. Vitamin D insufficiency was found in 42.1% of cases and 19.3% of control. According to chi-square the p-value is 0.003 showing significant association. There was a tendency towards decrease in vitamin D level with increase in disease duration. There was negative correlation between vitamin D and PASI score.

Conclusion: The study found a significant relationship between vitamin D and psoriasis. Further metanalysis involving larger study population will be required to establish whether vitamin D levels benefits patient with psoriasis vulgaris.

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1. Introduction

Psoriasis is a multi-factorial chronic inflammatory skin disease. It is characterized by erythematous, oedematous plaque with silvery white micaceous scale. Histologically, there is disordered keratinization with increase cell turn-over, perivascular mixed inflammatory infiltrate and tortuous, dilated vessels. The prevalence varies from 0.44% - 2.8% in India;¹ with equal sex ratio and bimodal age of onset.

Its aetiology is unknown; involving various environmental, genetic and immunological factors. On the basis of HLA-Cw6 association it is divided into type 1 psoriasis which is early onset HLA associated and type 2 psoriasis which is late onset HLA not associated. According to genome wide association studies there are mainly 9 psoriasis susceptible genes (PSORS 1-9) known which accounts for psoriasis risk. It involves both type of immune system with classical involvement of Th1, Th17, Th22 pathway.

Upon damage to keratinocyte due to any cause in psoriasis susceptible individual there is increased production of antimicrobial peptide (LL-37) and various

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cytokines mainly TNF alpha, INF gamma, IL 6, IL 1beta, IL 12, IL 23 via activated dendritic cell resulting in T cell differentiation, keratinocyte hyper-proliferation and neutrophil and lymphocyte infiltration forming a psoriatic plaque. There is a cross-talk between epidermal and dermal cells with release of various growth factors and chemokines forming a self-perpetuating inflammatory loop.

Psoriasis is classified into many types, most common being chronic plaque psoriasis also known as psoriasis vulgaris.

Vitamin D functions as a hormone and synthesized via photochemical reaction in the skin by UVB radiation and hydroxylation of ProvitaminD3 (7-dehydrocholesterol) in liver and kidney.² The active form of vitamin D [25(OH)D] through Vitamin D receptor (VDR) which is present on keratinocyte and T cells. It regulates keratinocyte maturation, apoptosis, cutaneous immune response via influencing dendritic and T cell function, inducing regulatory T cell and shifting towards Th2 profile and down regulating various cytokines including IL-2, IL-6 and IL-12, IFN- γ , TNF- α and TNF β , also suppresses NK cell and neutrophil functions thereby exerting anti-inflammatory, immuno-modulatory and anti-proliferative effect.^{3–6}

Current knowledge has stressed upon the immuno-modulating effect of vitamin D and its usefulness in reducing clinical severity and long term need of medication with altering the risk profile for several metabolic disorder.

With this in mind, we investigated the serum vitamin D levels in patient with psoriasis and healthy controls to understand whether vitamin D levels has a role in psoriasis pathogenesis or severity.

2. Materials and Methods

Clinically diagnosed 57 patients of chronic plaque psoriasis and 57 healthy controls were studied during a period of January 2020 – December 2020.

This was an observational case-control study where detailed and informed consent was taken from both the groups. A detailed history was inquired and clinical examination was done with evaluation of serum vitamin D levels.

2.1. Inclusion criteria

Clinically diagnosed chronic plaque psoriasis patients and healthy controls of age > 15 years of any sex.

2.2. Exclusion criteria

Other types of psoriasis patient and those on treatment, which might influence vitamin D status.

3. Results

A total of 114 subjects participated in the study with majority (37.7%) belonged to 55-65 years of age group having male predominance (71.9%).

There was 18.4 % prevalence of vitamin D deficiency in the study subjects.

Vitamin D deficiency (<20 ng/ml) was seen in 22.8% of cases and 14% of control group, whereas insufficiency (20-30ng/ml) was seen in 42.1% of cases and 19.3% of controls.

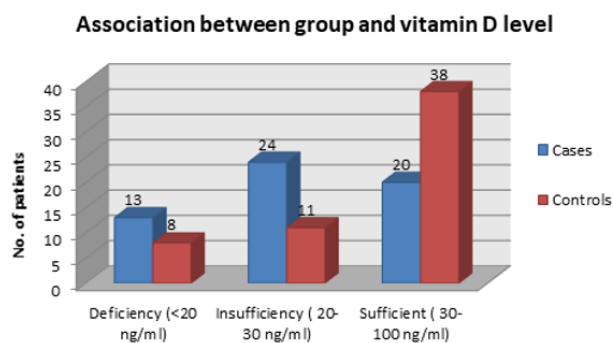


Fig. 1: Association between and vitamin D level

Majority of cases (56.1%) belonged to 1-5 years of disease duration.

Most of cases with higher vitamin D deficiency (53.8%) belonged to moderate (3-10) PASI score category.

Bulk of cases (47.4%) belonged to severe (>10) PASI category with mean vitamin D level 26.94 \pm 7.19 ng/ml.

We found a significant ($p < 0.01$) association of vitamin D levels among cases and controls.

We observed significant ($p < 0.000$) difference of vitamin D levels in cases and control group with mean vitamin D level in case was 31.55 \pm 15.76 ng/ml and in control was 42.59 \pm 16.92 ng/ml.

We found a negative correlation of vitamin D levels with duration of disease $r = -0.481$, $p = 0.000$.

We observed a negative correlation of vitamin D levels with PASI psoriasis severity score $r = -0.523$, $p = 0.000$.

4. Discussion

In the present study, majority of psoriasis cases belonged to the 55-65 years of age group [31.6%]. The mean age of psoriasis in cases was 46.912 \pm 14.77 years and 50.73 \pm 13.95 years in control group. This mean age is almost same as reported by Srirama L et al in an Indian study.⁷

In this study, majority [68 (59.6%)] of patients belonged to rural areas may be because the study was done in semi-urban area.

We observed 18.4% prevalence of vitamin D deficiency in our study. This finding was similar to study done in Egypt by Hesham Abd El-Moaty Zaher et al.⁸ We also observed prevalence of vitamin D insufficiency to be 30.7% in study

Table 1: Association between group and vitamin D level

Vitamin D	Group		
	Cases	Controls	Total
Deficiency (<20 ng/ml)	13 22.8%	8 14.0%	21 18.4%
Insufficiency (20-30 ng/ml)	24 42.1%	11 19.3%	35 30.7%
Sufficient (30-100 ng/ml)	20 35.1%	38 66.7%	58 50.9%
Total	57 100.0%	57 100.0%	114 100.0%

Chi-square=11.605; p=0.003

group. We found a significant association between vitamin D and cases and controls ($p < 0.01$).

The mean vitamin D among cases were 31.55 ± 15.76 ng/ml and controls were 42.59 ± 16.92 ng/ml. This showed a highly significant difference of vitamin D levels between cases and controls ($p < 0.000$). This result was found to be consistent when compared with the other studies done in other parts of the world.

El-Moaty Zaher et al conducted a case control study in 40 psoriatic patient v/s 40 healthy controls which showed a significant difference in vitamin D levels with $p < 0.000$, another comparison study consisting of 200 subjects done by Al-Mutairi et al found significant difference in vitamin D levels with $p < 0.0001$.^{8,9}

We observed that higher percentage [6 cases] of vitamin D deficiency was in 5-10 years of disease duration, while insufficiency [17 cases] was higher in 1-5 years of disease duration.

There was negative correlation of disease duration with vitamin D levels ($p = 0.000$) in our study with the mean vitamin D level was 21.38 ± 7.63 ng/ml in psoriatic patients with >10 years of disease duration. This finding was consistent with that reported in a meta-analysis.¹⁰

The mean vitamin D levels in Severe PASI category was found to be lowest (26.94 ± 7.19 ng/ml) among 3 PASI group. We found a significant correlation of mean vitamin D levels with PASI score category ($p=0.000$) which was similar to that observed by Stoyan et al.¹¹

It is now considered that psoriasis is a systemic inflammatory disease, mainly involving Th1-Th17-Th22 immune pathway. It presents as abnormal keratinocyte hyperproliferation and infiltration of inflammatory cells. Vitamin D is known to regulate at physiological level cell differentiation and proliferation, immune modulation, expression of K1 and K10 and normal distribution of integrins. These suggests that vitamin D may have a role in psoriasis. The serum level of vitamin D is affected by various factors like polymorphism or deficiency of Vitamin D receptor (VDR), which is required for active vitamin D uptake and function, less dietary intake or intake of food items or drug which interfere with vitamin D synthesis and activation, adequate sun-exposure and clothing for cutaneous synthesis of vitamin D which is disturbed as psoriasis patient tend to cover their affected area. Various metabolic disorder tends to reduce the bioavailability of circulating vitamin D via accumulating it in fat cells.

5. Conclusion

To conclude, our study showed a significant correlation of psoriasis with vitamin D but it is still not clear to say that serum vitamin D levels interfere with psoriasis disease duration or severity. Further meta-analysis is required to understand the exact correlation.

6. Source of Funding

There was no financial support received for the work.

7. Conflict of Interest

The author has no conflict of interest to declare.

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