

Assessment of 25-Hydroxy Vitamin D Status in Patients Suffering from Psoriasis Along with the Comparison of Controls without Psoriasis: A Comparative Study in Northern India Region

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ABSTRACT

Background: Vitamin D level in serum is one such factor which has been found to be relevant in psoriasis so the aim of the present study is to assess the status of 25-hydroxy vitamin D in patients suffering from psoriasis along with the comparison of controls without psoriasis. **Methods:** The study included 40 cases and 40 controls. 40 outpatients, 30 male and 10 female, diagnosed clinically with psoriasis were enrolled in this study. Clinically diagnosed active psoriasis patients of any severity, aged more than 18 years, who had not been treated with phototherapy or vitamin D the previous 3 months, were enrolled as cases. Age, sex matched volunteers from the same geographical area attending the dermatology outpatient services as an attendee for the patient without any skin ailments were selected as controls. Appropriate informed consent in the local vernacular language was obtained from both cases and controls. **Results:** There was a statistically significant difference between cases and controls ($P < 0.0001$). Vitamin D deficiency was observed in 78% of psoriasis patients compared with 28% of controls ($P < 0.001$). Vitamin D deficiency was seen in 18 non-obese and 15 obese individuals. We did not find significant differences in vitamin D levels between patients with psoriasis and controls ($P = 0.742$). **Conclusion:** Vitamin D deficiency may be common in patients with psoriasis, and vitamin D has a role in immune regulation.

Keywords: Vitamin D, deficiency, psoriasis, severity

INTRODUCTION

Psoriasis is considered to be a T-cell-mediated inflammatory skin disease, which is characterized by hyperproliferation and poor differentiation of epidermal keratinocytes. Psoriasis is estimated to affect about 2–4% of the population in western countries.^[1] From the available studies, the prevalence of psoriasis in India ranges from 0.44 to 2.8%.^[2] A number of risk factors have been recognized in the etiology and pathogenesis of psoriasis, including family history and environmental risk factors, such as diet, obesity, smoking, stress, and alcohol consumption.^[3] Moreover, dietary factors can also affect both drug pharmacokinetics and pharmacodynamics. A number of single food components have been suggested to play a role in psoriasis. A large number

of research studies have demonstrated higher risk of cardiovascular diseases in psoriasis.^[4-8] So it is imperative to search for all the factors responsible for adverse quality of life, cardiovascular events, aggravation and treatment resistance of disease in psoriasis. Vitamin D level in serum is one such factor which has been found to be relevant in psoriasis. Current knowledge has stressed upon the role of vitamin-D in regulating the proliferation, differentiation and apoptosis of keratinocyte through its vitamin-D receptors.^[9,10] Vitamin-D also have immunomodulating actions on cells of both innate and acquired immunity and it is also found to have beneficial actions in inflammatory diseases mediated by type-1 helper T-lymphocytes.^[11,12] This has made topical vitamin-D as one of the treatment options in psoriasis, however a dearth of knowledge on the vitamin-D serum level among the psoriasis patients still exists.^[12] Here we present the data of a case control evaluation of vitamin D serum levels in psoriasis patients attending a tertiary care hospital in Chennai.

Defining a level of serum 25 (OH) D as low or insufficient depends on the level that is defined as normal. Health authorities used different cutoffs for

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their definitions of sufficient and optimal status. The Institute of Medicine Committee found 20 ng/ml to be the level that is needed for good bone health for all individuals.^[13] Substantial evidence suggests that vitamin D plays a pivotal role in modulating dendritic cell function and regulating keratinocytes and T-cell proliferation.^[14,15] Epidemiological data have also confirmed that vitamin D deficiency may be a risk for the development of autoimmune diseases, including rheumatoid arthritis, multiple sclerosis, systemic lupus erythematosus, and Crohn's disease.^[16-19]

Previous studies on the relationship of diet and nutrition with psoriasis have focused on either individual nutrients (e.g. fish oil, omega-3, vitamin B12, vitamin D, vitamin A, selenium, inositol, and zinc and antioxidants) or individual food groups (e.g. fruit, vegetables, and fish).^[20,21] Although many studies have evaluated the role of vitamin D in psoriatic disease, there are less/no studies that have been investigated in the Northern India. Hence, the current study was conducted to analyze vitamin D levels in psoriasis at this region in comparison with age- matched and sex-matched controls.

MATERIALS AND METHODS

This comparative study was carried out in the dermatology outpatient department of Rajshree Medical Research Institute Bareilly. The study was approved by ethical committee of the institution. The study included 40 cases and 40 controls. 40 outpatients, 30 male and 10 female, diagnosed clinically with psoriasis were enrolled in this study. Clinically diagnosed active psoriasis patients of any severity, aged more than 18 years, who had not been treated with phototherapy or vitamin D the previous 3 months, were enrolled as cases. Age, sex matched volunteers from the same geographical area attending the dermatology outpatient services as an attendee for the patient without any skin ailments were selected as controls. Appropriate informed consent in the local vernacular language was obtained from both cases and controls. Exclusion criteria were as follows: pregnancy or lactation; topical or ultraviolet B therapy within previous 2 weeks; systemic corticosteroids, PUVA, or laser phototherapy within previous 4 weeks; other systemic therapies or biologics within previous 12 weeks; and age younger than 18 years. Moreover, patients on vitamin D supplement/ receiving steroid preparations or those having any other autoimmune disease were excluded from both the case and the control group.

Statistical analyses were performed using SPSS data analyzer. Continuous variables were summarized using mean and standard deviation (mean \pm SD). For the bivariate analysis, when the variables were parametric, the difference of averages test (Student's t-test) was used; in the case of variables with more

than two categories, the one-way ANOVA test was carried out. Also, chi-square tests were used for categorical variables. Simple and multiple logistic regression analysis was performed to assess the association between vitamin D deficiency and pneumonia. Significance levels were determined using two-tailed tests, and also 95% CIs for relative risks were calculated. P-value of less than 0.05 was considered statistically significant in all tests.

RESULTS

The mean vitamin D level in patients was 19.29 \pm 5.61 ng/ml (minimum: 5.3 ng/ml and maximum: 31.58 ng/ml), whereas in controls it was 23.19 \pm 11.71 ng/ml (minimum: 7.8 ng/ml and maximum: 35.8 ng/ml). There was a statistically significant difference between cases and controls (P<0.0001). Vitamin D deficiency was observed in 78% of psoriasis patients compared with 28% of controls (P<0.001). Vitamin D deficiency was seen in 18 non-obese and 15 obese individuals. (Table 1).

Table 1: Vitamin D levels in cases and controls

Vitamin D level	Psoriasis	Control	P-value
Mean \pm SD	19.29 \pm 5.61	23.19 \pm 11.71	0.001
Minimum	5.3	7.8	-
Maximum	31.58	34.8	-

[Table 2] shows demographic data and serum levels of 25-hydroxyvitamin D in the patients. Distributions by gender, age and phototype were not significantly different. Only 2 cases and 4 controls presented sufficient levels of vitamin D. Including all of the participants in the study, the median vitamin D level was 25.59 \pm 9.68 and it was lower in those that were exposed to sunlight for less than 30 minutes per day (P =0.04). We did not find significant differences in vitamin D levels between patients with psoriasis and controls (P = 0.742).

Table 2: Comparison of variables studied between the psoriasis group and the control group

Variable		Psoriasis	Controls	p
		(n=40)	(n=40)	
Sex	Females	28	26	-
	Males	12	8	0.539
Current age		48.49 \pm 16.91	49.88 \pm 20.8	0.868
Phototype	1-2	16	20	-
	3	10	12	0.999
	4-5	14	8	0.712
Daily direct sun exposure (min.)		27.3 \pm 12.4	37.5 \pm 100.9	0.161
25-Hydroxyvitamin D		25.59 \pm 9.68	24.38 \pm 5.18	0.742
Deficiency VD		10	8	-
Insufficiency VD		26	24	0.999
Sufficiency VD		4	8	0.609

The mean age of psoriatic patients was 40.28 ± 11.81 years, and the mean age of control group was 40.31 ± 11.81 years, there was no significant difference between the two groups. Both groups were similar in terms of sex, urban/rural background, BMI and daily sunlight exposure [Table 3].

Table 3: Comparison of demographic variables between psoriasis patients and controls.

Variables	Psoriasis patients (n=40)	Controls (n=40)	P value
Age (mean± SD) (years)	40.28±11.81	40.31±11.81	0.986
Sex			
Male (n) (%)	30 (75%)	30 (75%)	1.000
Female (n) (%)	10 (25%)	10 (25%)	
Background			
Urban (n) (%)	22 (55%)	22 (55%)	1.000
Rural (n) (%)	18 (45%)	18 (45%)	
BMI (mean±SD) (kg/m ²)	25.39±2.99	24.94±2.83	0.339
Daily sunlight exposure (mean±SD) (minutes)	231.88±159.38	236.26±154.96	0.839

DISCUSSION

Several studies of the efficacy of narrow-band ultraviolet-B (NB-UVB) rays have shown positive effect of increased vitamin D level in these patients which has improved our opinion regarding role of systemic vitamin D therapy in psoriasis.^[22-27] Since 1930, relationship of low vitamin D levels in psoriasis has been studied. In 1985, Morimoto found out that a few cases of psoriasis improved with vitamin D.^[28] In 2012, Orgaz-Molina et al found lower vitamin D levels in psoriasis patients as compared to control group.^[29] In another study, Gisondi reported that psoriatic patients had 2.5 times higher risk of vitamin D deficiency than controls.^[30] Ricceri and others found a prevalence of vitamin D insufficiency in 97% and deficiency in 68% of patients as compared to 53% and 10% in controls, respectively.^[31] The major finding of this study is that vitamin D deficiency is very frequent in patients with psoriasis vulgaris. Gisondi et al.^[30] found that this finding was more common in winter, but it was also found in summer in ~50% of patients. The present study was conducted in summer months, and this coincides with the above study. The association between vitamin D insufficiency and psoriasis was confirmed independent of age, sex, BMI, and PASI score. Vitamin levels are higher in those who have greater BMI, and this finding also coincides with the studies by Orgaz- Molina et al.^[32] and Rossini et al.³³ Few studies explored low levels of 25(OH)D associated with vitiligo. In the present study, two patients with psoriasis also had vitiligo. This supports the above study and the study conducted by Marques et al.^[34] which explored vitamin D deficiency related to autoimmunity. Vitamin D

deficiency in psoriasis may be because of changes in isoenzymes needed for vitamin D synthesis. A few studies have reported vitamin D Receptor (VDR) polymorphism difference in psoriasis patients and general population.^[35] Vitamin D deficiency in psoriasis may also be secondary to inflammatory milieu in the body, as c- reactive protein (CRP) was found to be negatively correlated with vitamin D deficiency.^[32] Majority of psoriasis patients in the present study were found to have either deficiency or insufficiency of vitamin D, which could contribute to precipitation, aggravation, treatment resistance and evolution of the disease.

CONCLUSION

In conclusion, vitamin D deficiency may be common in patients with psoriasis, and vitamin D has a role in immune regulation. Therefore, patients could be routinely screened for serum vitamin D levels for a more comprehensive management. It is suggested that more attention be paid to vitamin D deficiency in infectious diseases, particularly in CAP. Further studies with larger sample sizes are needed to confirm the allegation of higher incidence of CAP in vitamin D-deficient individuals.

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