DOI: https://doi.org/10.53350/pjmhs2023173646

ORIGINAL ARTICLE

Effect of Serum Vitamin D Content on the Clinical Course of Psoriasis

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ABSTRACT

Objectives: To evaluate the incidence of serum vitamin D insufficiency in patients with psoriasis and study the relationship between dietary intake of vitamin D and clinical characteristics.

Materials and Methods: Totally eighty individuals were enrolled and were equally divided into two groups (40 patients in each group): Group A consisted of psoriasis patients, whereas Group B consisted of controls. By using the PASI scale, psoriasis plaques were identified and assessed. The predesign questionnaire was developed and was given to each participant to complete it. Age, gender, the length of the psoriasis, concurrent illnesses, and medications were among the collected data. A dermatologist examined all of the patients and gathered information about their demographics, health, and any other pertinent information. Blood samples were taken to measure the level of serum vitamin D using the immuno-enzyme method. All measurements were conducted during winter months to avoid the influence of sun exposure on synthesis of vitamin D3 and its derivative 25-hydroxycholecalciferol. SPSS (v 25.0) was used for analysis and the results were shown in the form of graph and table.

Results: Statistically significant difference was found in 25(OH) D3 levels between psoriasis affected individuals and healthy individuals. Both groups have low level of 25-hydroxycholecalciferol. In our results there is negative correlation between 25(OH) D3 and PASI. There is also a negative correlation between 25(OH) D3 and duration of psoriasis.

Practical implication: This study will help the clinical practitioner to advise the patients with psoriasis to use enough amounts of vitamin D3 that will help to normalize the vitamin D level in patients. It is believed that psoriasis can cause a progressive decrease in the level of vitamin D3 derivatives in the whole human body, including the skin. So vitamin D rich food must be eaten in high amount.

Conclusion: It is found in this study that both the groups have low serum vitamin D3 level. Both the general public and persons with psoriasis should eat enough amounts of vitamin D3.

Keywords: PASI, vitamin D3**,** Psoriasis, serum, antiproliferative,

INTRODUCTION

A skin disease with hyper proliferative characteristics and autoimmune pathogenic characteristics, psoriasis has a strong genetic predisposition [(1)]. The prevalence differs by region and is approximately 2% globally [(2)]. It has a reduced prevalence in populations from Asia and some parts of Africa, and can reach 11% in populations from Scandinavia and the Caucasus [(3, 4)]. According to estimates, 2% of American adults are affected, and the incidence is roughly equal for men and women [(5).] Although psoriasis can appear at any age, it usually first appears between the ages of 15 and 30 [(6)]. There is no way to anticipate the clinical course. Individualized treatment under close supervision can reduce mortality and improve quality of life. Analogs of vitamin D3 are frequently used to cure psoriasis [(7)]. Many drugs are used to treat psoriasis, either alone or in combination with topical steroids like betamethasone dipropionate [(8)]. These analogues have considerable anti-inflammatory properties [(9)]. Additionally, it affects keratinocytes in a pro-differentiating and antiproliferative manner.

It is well known that the 1, 25-dihydroxyvitamin D3 active form affects bones and regulates the calcium to phosphate ratio. It has been stated in literature that 1,25(OH)2D3 has considerably more significant effects in a number of tissues that have vitamin D receptor (VDR) or have enzymes required for 1,25(OH)2D3 production [(10)]. This study will assist clinical practitioners in advising psoriasis patients to take adequate doses of vitamin D3 to help normalise patients' vitamin D levels. The level of vitamin D3 derivatives in the human body as a whole, including the skin, is thought to be affected by psoriasis. Therefore, foods high in vitamin D must be consumed frequently.

Objective: To evaluate the incidence of vitamin D serum insufficiency in psoriasis patients and study the relationship between dietary intake of vitamin D and clinical characteristics.

MATERIALS AND METHODS

Study Design: Prospective Cross-sectional study**.**

Study setting: This study was conducted at Department of Dermatology Xinjiang Medical University, Urumqi China.

Duration of the study: Duration of the study was 6 months (June 2022 – Dec 2023).

Inclusion Criteria

- Patients of age >18 years.
- Both genders.

Exclusion Criteria

- Patients receiving treatment interventions such calcium supplements, bisphosphonates, systemic corticosteroids, and vitamin D.
- Individuals who also have a cancer or chronic inflammatory disease.
- Patients with psoriasis receiving phototherapy or dermal vitamin D treatments.

Methods: Our study included 80 patients in total. Ethical approval was obtained from CPSP. The patients' or their guardians' informed consent was gained. The patients were split into two groups: Group A included psoriasis affected individuals, whereas Group B included healthy individuals. The predesign questionnaire was given to each participant to complete it. Age, gender, the length of the psoriasis, concurrent illnesses, and medications were among the collected data. In the patient sample, psoriasis ranged from mild to severe. A specialised medical team identified and assessed the psoriasis plaques using the PASI. A dermatologist examined all of the patients and gathered information about their demographics, health, and any other pertinent information. Cases were paired for comparison based on age and gender. A vitamin D3 derivative's serum level might be determined using collected blood samples and an immuno-enzyme evaluation technique. The method has an inter-series error of 7.4%, an in-series error of 6%,

and a sensitivity of 6.2 nmol/l. To prevent the effects of solar energy on the vitamin D3 synthesis and its byproduct 25-hydroxycholecalciferol, all assays were carried out in the winter.
Statistical Analysis: SPSS (v 25.0) was used for analysis and the results were shown in the form of graph and table.

RESULTS

There were 80 patients, of which 47 were men and 33 were women. According to the study utilising the Mann-Whitney U test ($p = 0.048$), there was a statistically significant difference in 25-hydroxychole calciferol levels between healthy individuals and psoriasis patients. In both groups the level of 25(OH) D3 was woefully insufficient. Additionally, there was a negative correlation between the PASI and the duration of psoriasis as well as the serum level of 25-hydroxycholecalciferol ($r = -0.43$ and -0.53, respectively) (Fig 2-0).

Table 1: Patient Distribution Based on Gender (n=80)

Gender	Frequency	Percentage
Male	47	58.8
Female	33	41.3

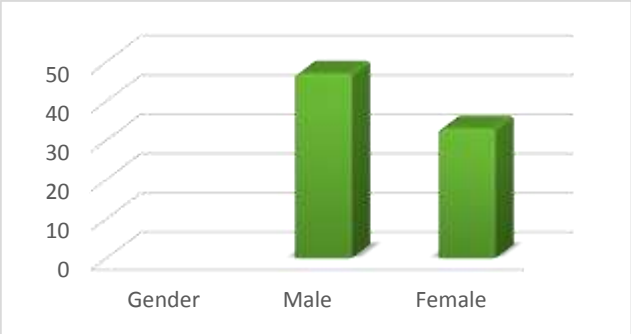

Fig 1: Graphical Representation of Patients on the basis of gender (n=80)

Table 2: Serum Level Of 25(OH) D3, PASI, Age and

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Study group	40	32.26	6.93	22.30	45.30
PASI	40	10.37	4.95	2.0	25.0
Duration of psoriasis	40	12.44	6.07	1.20	33.0
control	40	55.03	7.94	45.0	87.0

Duration of Psoriasis in Study And Control Groups

Table 3: 25(OH) D3 Serum Level in Male

Variable	N	Mean	Standard Deviation
Study Group	24	31.40	7.51
Control Group	23	40.62	12.54

Table 4: 25(OH) D3 Serum Level in Female

Variable	N	Mean	Standard deviation
Study Group	16	57.56	11.0
Control Group	17	51.94	1.80

$r = -0.4127$

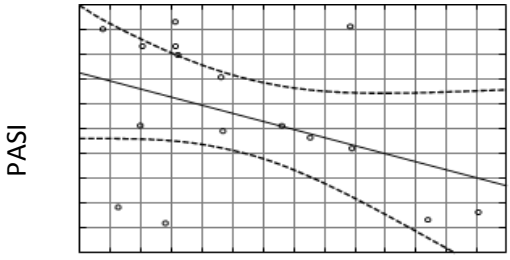

Fig 2: 25-hydroxycholecalciferol level had a negative correlation with PASI ($r = -0.43$) and psoriasis duration ($r = -0.53$)

DISCUSSION

It is commonly known that vitamin D, also known as the "sunshine hormone," is crucial for the health of the skeleton [11]. It has been stated that vitamin D is associated with lower risk of non-communicable diseases like cancer, autoimmune diseases, allergies, asthma, multiple sclerosis, depression, dementia, and chronic infections like skin infections [12, 13]. Vitamin D3 and its analogue have significant pro-differentiating and antiproliferative effects on both normal and malignant cell types. In numerous tissues and cells, vitamin D has been shown to have potent antiproliferative effects. [14]. For the treatment of secondary hyperparathyroidism, osteoporosis, or psoriasis, a number of vitamin D3 analogues have been approved, and they typically make up the first or second line of treatment [15]. Numerous recent studies have shown that, in addition to its well-known key function in calcium/phosphate balance, 1,25(OH)2D3 can also have an impact on immunological function, cell differentiation, and growth, among other things [11]. The mechanism of action of vitamin D analogues still needs to be clarified through additional research. Undoubtedly, the cause of why particular analogues exhibit super agonistic action in particular tissues is still unknown, despite the fact that various studies have attempted to shed light on the processes behind these tissue-specific effects. The breakdown process may also potentially affect the tissue-specific effectiveness of vitamin D analogues since some cell types favor specific catabolism routes and enzymes over others. Because the vitamin D binding protein (DBP) controls how much vitamin D is available to tissues, it is possible that this affinity also contributes to the activity of vitamin D analogues [9, 16].

In our study, both groups' 25-hydroxycholecalciferol serum levels remained below the range for normal serum levels recommended by the American Society for Bone and Mineral Research. The affected individuals had much lower levels of 25-hydroxycholecalciferol than healthy people did, with patients with severe psoriasis having the lowest levels. These findings agree with comparable findings made by Ricceri et al.[17] and Orgaz-Molina et al (18). In their analysis, Orgaz-Molina et al. produced an unusual finding: they found that psoriatic patients with a body mass index of 27 or above had a higher risk of 25-hydroxycholecalciferol insufficiency. A potential reason for this relationship could be that heavier psoriatic patients engage in less physical activity, which results in less sun exposure. Another theory is that vitamin D3 is being sequestered more often in fat, which could lower its bioavailability in serum [18].

People's skin produces vitamin D3 after being exposed to ultraviolet B (UVB) light with a wavelength of 290 to 320 nm [19]. A number of clinical investigations have evaluated how exposure to light affects the synthesis of 25-hydroxycholecalciferol. Ala-Houhala et al. examined the effects of UVBnb phototherapy on the severity and quantity of skin lesions in psoriasis patients as well as the amount of 25-hydroxycholecalciferol in their serum. In the study, the responses to UVBnb of 12 individuals who were additionally getting oral cholecalciferol supplements of 20 g per day were examined. Blood levels of 25-hydroxycholecalciferol were 74.14 nmol/l at baseline (far higher than in our study), and after the 18th UVBnb exposure, they rose by 49.4 nmol/l above baseline [20]. The term "total vitamin D intake" refers to the sum of the dietary contributions from both foods and supplements, which are two dietary sources of vitamin D. The diet has a few naturally available sources of vitamin D. These consist of egg yolk, fatty fish, and fish liver oil. However, certain meals have vitamin D added to them [21]. Unfortunately, few meals contain much vitamin D3, and those that do tend to be taken infrequently, which may be a significant factor in why neither study group consumes enough vitamin D3. According to Finamor et al.[22] that prolonged administration of high-dose vitamin D3 may have a considerable beneficial impact on psoriasis patients. The serum level of 25-hydroxycholecalciferol significantly increased as a result of taking vitamin D3 (35,000 IU daily), and this was found to be associated with a significant rise in each patient's PASI score. In general, all

patients exhibited low serum 25-hydroxycholecalciferol levels at baseline, which is consistent with our findings. A balanced diet and moderate sun exposure throughout the year are both recommended to maintain adequate levels of vitamin D3 metabolites and keep blood levels of 25-hydroxycholecalciferol within reference ranges. [10].

CONCLUSION

It is concluded that there is a need for further research to determine the vitamin D3 status of our population. It is clear from this study that low serum levels of vitamin D3 was present in both the groups. It's crucial to keep in mind that eating foods high in vitamin D and getting enough sun exposure are both necessary for maintaining an optimum amount of the vitamin. Both the general public and persons with psoriasis should eat enough amounts of vitamin D3, yet due to changed vitamin D3 metabolism, these two groups have different vitamin D3 requirements.

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