

Assessment of Vitamin D Level in Psoriasis and Psoriatic Arthritis Patients

OBAID UR RAHMAN¹, AURANGZAIB KHAN², MUNAZA KHATTAK³, SHABIR AHMED ORAKZAI⁴, TEHSEEN NAVEED⁵, MOHAMMAD FAROOQ⁶

¹Assistant Professor Department Of Biochemistry, Swat Medical College

²Associate Professor Pathology Swat Medical College

³Associate Professor Physiology Peshawar Medical College & Dental College, Peshawar

⁴Associate professor Pathology Swat Medical College

^{5,6}Assistant Professor Dermatology CMH Peshawar

Corresponding Author: Shabir Ahmed Orakzai

ABSTRACT

Objective: Investigating the relationship between vitamin D status and psoriasis and psoriatic arthritis is the goal of this investigation.

Methods: 120 individuals with psoriasis & 38 patients with psoriatic arthritis (PsA) participated in a case-control research; 89 (56.3%) of the patients were men. Every patient with psoriasis had their erythrocyte sedimentation rate (ESR) and disease activity score utilizing 28 joints (DAS28) computed, and every person with PsA had their disease area and severity index (PASI) assessed. 164 volunteers, matched for age and sex (91 men and 73 women), made up the control group. Serum vitamin D levels were measured in both patients and controls.

Results: Both patients' and controls' vitamin D levels were 17.4 and 28.3 respectively. When compared to patients with disease durations of 10 years or less, the level of vitamin D was lower in patients with disease durations equal to or greater than that. The two patient groupings' vitamin D levels do not significantly differ from one another. Psoriasis and PsA have been associated with elevated PASI and DAS28 levels due to low vitamin D levels.

Conclusion: Low blood Vitamin D levels are connected with patients who have psoriasis and PsA. In both PsA and psoriasis, vitamin D insufficiency has been linked to the persistence of the illness.

Keywords: vitamin, psoriasis, diseases severity index, psoriatic arthritis

INTRODUCTION

Psoriasis is an autoimmune skin disease that causes a persistent rash that can appear anywhere on the body, including the scalp, palms, and soles. (1) Up to 80% of individuals with psoriatic arthritis and 50–79% of patients with skin psoriasis may have nail damage. (2) Pathological pathways mediated by the immune system and hereditary factors seem to affect psoriasis. (3, 4) Although the specific origin of psoriasis is uncertain, it is known that the disorder is associated with increased T-cell activation and keratinocyte differentiation. (3), in addition to a number of pro-inflammatory mediators include tumour necrosis factor, interleukin. (5) The prevalence ranges from 1-3% globally. (6) Inflammatory arthritis, or PsA, manifests as pain and stiffness in the afflicted joints and occurs in 30% of psoriasis patients. Women and men are equally affected by psoriasis and PsA. PsA presents in a variety of ways and may affect the peripheral joints as well as the axial bone (spondylitis and/or sacroiliitis). Skin, nails, and entheses are also affected. Psoriasis may have several comorbidities such as diabetes mellitus, hypertension, and obesity. Low bone mineral density and psoriasis have been linked in recent research. (6) The sun's ultraviolet B is the principal source of vitamin D, which is the oldest hormone. It is a key regulator of the homeostasis of mineral ions. Its absence has been linked to osteomalacia, osteoporosis, and rickets. The biological functions of vitamin D are carried out by its active form, calcitriol, also known as 1, 25-dihydroxyvitamin D. Low 25(OH)D levels are mostly caused by impaired synthesis brought on by insufficient sun exposure or dark skin and poor food intake. (7), it is well known that vitamin D has a wide range of physiological effects. Osteoblasts, enterocytes, immunological cells, parathyroid cells, keratinocytes, & ovarian cells vitamin D receptors and the enzyme CYP27B1, which is essential for 25-hydroxyvitamin D synthesis. (8) According to available data, vitamin D is essential for regulating keratinocyte and T-cell proliferation, dendritic cell function, and other processes. (9) Numerous dermatological disorders, including atopic dermatitis and psoriasis, have been linked in the literature to low or insufficient amounts of vitamin D in the blood. (10) (11, 12) There is consensus, nonetheless, that a blood Vitamin D level below 20 ng/mL indicates a Vitamin D deficiency, whilst a level between 20 and 30 ng/mL is considered to indicate Vitamin D insufficiency.

(13) Investigating the relationship between vitamin D status and psoriasis and psoriatic arthritis is the goal of this research

METHODOLOGY

This case-control research was conducted from January 2020 to February 2021 in the dermatology and rheumatology outpatient clinics at CMH Peshawar. A sample of 158 individuals (89 men and 69 women) was separated into two subgroups: A dermatologist diagnosed 120 psoriasis patients outpatiently and 38 PsA patients who met the classification criteria for PsA. (14), and 164 age- and sex-matched controls from the general community (91 men and 73 women) were included for this research. The patients were questioned using a special questionnaire that the researchers had developed in order to collect data. The questionnaire included questions on the patient's age, sex, length of illness, and history of drug usage. The total blood count and erythrocyte sedimentation rate of all patients were checked. Both the patient and control groups had their serum vitamin D levels assessed.

The dermatologist calculated the Area and Severity Index for Psoriasis (PASI) (15) for all psoriasis patients. PASI is a weighted assessment that considers lesion redness, thickness, and scalliness (all of which are scored on a scale from 0 to 4). (head, limbs, trunk, legs) (15). A rheumatologist evaluated the disease activity score utilizing 28 joints (DAS28) and the ESR in all PsA patients. Those with endocrine, metabolic, renal, or malabsorption problems, as well as those who use systemic steroids, were excluded from the study. (16)

Statistical analysis: We used the SPSS software, version 25.0, to do the analysis on the data. The data were organized into tables using percentages and the mean, which were calculated from the data. Both the Student's t-test as well as the Chi-square test were utilized in order to make comparisons between the different research groups. The Student's t-test was utilized in order to analyses continuous data. When p was less than 0.05, the statistics were deemed to be significant.

RESULTS

Table 1 demonstrates the demographic disparities that exist between the study participants and the controls. 89 men and 69

women, with mean ages and illness durations of 51.4 and 14.1, respectively, made up the 158 patients (120 with psoriasis and 38 with PsA). There were 164 people in the control group (91 men and 73 women). The levels of vitamin D were 17.4 ng/ml & 28.3 ng/ml, respectively, in Table 2. The change was large enough to require statistical consideration ($p < 0.05$). Patients with disease present for more than 10 years had a vitamin D level of 14.4 ng/ml compared with those with disease present for less than 10 years. This difference was statistically significant ($p < 0.05$). The correlation between the amount of vitamin D and the length of the condition is shown in Table 3. Psoriasis patients had vitamin D levels of 17.8 ng/ml, that is higher than patients with PsA, the difference does not constitute a statistically significant finding ($p > 0.05$) according to table 4. The relationship between vitamin D level & disease activity in the subgroups of patients with psoriasis and PsA is shown in Table 5. In both psoriasis and PsA, higher PASI and higher DAS28 were related to lower vitamin D levels, respectively.

Table 1: presents the demographic makeup of the patient group as well as the controls.

Characteristic	Patient group	Control group	p-value
Psoriasis	120		
Psoriatic arthritis	38		
Males	89	91	>0.05
Females	69	73	
Age	51	51.4	
Disease duration	14.1		>0.05
Treatment	Topical, anti-tumor necrosis factors, methotrexate		
Total no	158	164	

Table 2: The PATIENT'S group's vitamin D level is lower than that of the controls.

Characteristic	Control group	Patient group	p-value
Level of vitamin D	28.3	17.4	<0.05

Table 3: Patients with illness durations of equal to or more than 10 years have decreased vitamin D levels.

Characteristic	<10 group	10 years and more	p-value
Vitamin d level	24.8	14.4	<0.05

Table 4: Psoriasis patients had greater vitamin D levels than psoriatic arthritis

Characteristic	Psoriasis	Psoriatic arthritis	p-value
Vitamin d level	17.8	15.9	>0.05

Table 5: Vitamin D level is decreased in patients with high disease activity scores and high PASI scores for psoriatic arthritis in 28 joints.

Characteristic	Vitamin d level	p-value
High PASI in psoriasis	10.9	<0.05
with low-to-moderate PASI and psoriasis	25.2	
Psoriatic arthritis with high disease activity score using 28 joints	11.4	<0.05
utilizing 28 joints and a low-moderate disease activity score for psoriatic arthritis	25.8	

DISCUSSION

Different roles for vitamin D in the skin include inhibiting keratinocyte growth and inducing keratinocyte differentiation, as well as modulating immunological response. Vitamin D binds to the receptors found in keratinocytes, which are capable of generating Vitamin D, which has an autocrine effect on the receptors. Vitamin D inhibits important cytokines that are critical to psoriasis pathogenesis, such as Th1 and Th17 cytokines (17) Low vitamin D levels are therefore linked to the pathophysiology of this illness. The serum levels of Vitamin D between RA and psoriasis did not differ statistically significantly, similar to the findings of Gisondi et al. Both psoriatic and rheumatoid arthritis patients were found to have considerably reduced serum levels of vitamin D, according to

the findings of the study, which compared 145 psoriasis patients to 112 rheumatoid arthritis patients and 141 healthy controls. (18)

It is consistent with the findings of our study that psoriatic patients have significantly lower vitamin D levels than healthy controls. (19) The findings of our study supported those of Chandrashekar et al., Myliwiec et al., and Mattozzi et al., all of which revealed that psoriasis patients had lower levels of Vitamin D than healthy controls. (20, 21)

PsA patients have lower Vitamin D levels than controls, according to Ibrahim et al. Study populations had lower Vitamin D levels than healthy controls. There might be a number of explanations for why our research group's vitamin D levels were lower than those of the general population. (22)

In addition to being a cause or consequence of psoriasis and PsA, low Vitamin D levels may come from inadequate sun exposure, which may be connected to women covering their heads, or from taking Drugs that interfere with Vitamin D metabolism. (23) this study's results that low vitamin D levels are linked to chronic disease are comparable with those of Filoni et al previous research. (4) and Beata and Ligia (12) In addition to the way that women in our culture feel about wearing veils, psoriasis sufferers really constantly cover the regions that the disease has damaged. It will result in decreased UV exposure, which will lower Vitamin D levels, especially if the illness lasts for a long time. Therefore, individuals with a lengthy period probably might be more prone to Vitamin D lowered blood levels. (12) On the other hand, the cause of psoriasis may be related to reduced amounts of vitamin D. Psoriasis is a Th1-Th17-dependent innate and acquired immunological disease. Low vitamin D levels are linked to Th1-mediated autoimmune disorders. In this investigation, we discovered that in both of the subgroups of our study population, higher disease activity was related with lower levels of vitamin D. Similar to Chandrashekar et al. and Mattozzi et al., we identified a negative connection between PASI and blood 25-hydroxyvitamin D. However, it should be noted that there is ongoing debate regarding the connection between the severity of psoriasis and Vitamin D levels, and more research is required to resolve this issue. (20, 24) We also found a correlation between low vitamin D levels and higher disease activity (DAS28) in patients with PsA. These findings are in agreement with the findings of a study that was carried out by Ibrahim et al., who discovered that vitamin D levels and disease activity were inversely correlated in PsA patients. Our findings confirm recent research that found an unfavourable connection between vitamin D and psoriasis and PsA. (22),

CONCLUSION

Low blood Vitamin D levels are connected with patients who have psoriasis and PsA. Long disease duration was shown to be linked to vitamin D insufficiency in both psoriasis and PsA. Lower amounts of vitamin D are seen in patients with active diseases.

REFERENCES

- Rasmussen GS, Maingal HT, Lomborg K. Self-management in daily life with psoriasis: an integrative review of patient needs for structured education. *Nursing research and practice*. 2012;2012.
- Bardazzi F, Starace M, Bruni F, Magnano M, Piraccini BM, Alessandrini A. Nail Psoriasis: An Updated Review and Expert Opinion on Available Treatments, Including Biologics. *Acta Dermatovenereologica*. 2019;99(6).
- Al-Dhubaibi MS. Association between Vitamin D deficiency and psoriasis: An exploratory study. *International Journal of Health Sciences*. 2018;12(1):33.
- Filoni A, Vestita M, Congedo M, Giudice G, Tafuri S, Bonamonte D. Association between psoriasis and vitamin D: Duration of disease correlates with decreased vitamin D serum levels: An observational case-control study. *Medicine*. 2018;97(25).
- Keaney TC, Kirsner RS. New insights into the mechanism of narrow-band UVB therapy for psoriasis. *Journal of investigative dermatology*. 2010;130(11):2534.

6. dos Santos Diniz M, Pinto JM, Soares MMS. Serum levels of 25-oh Vitamin D in psoriatic patients and control subjects. *JOJ Dermatology & Cosmetics*. 2019;1(4):65-8.
7. Hallak A, Malhis M, Abajy MY. Vitamin-D deficiency and risk of acute coronary syndrome. *Int J Pharm Pharm Sci*. 2018;10:171-5.
8. Soleymani T, Hung T, Soung J. The role of vitamin D in psoriasis: a review. *International Journal of Dermatology*. 2015;54(4):383-92.
9. Rendon A, Schäkel K. Psoriasis pathogenesis and treatment. *International journal of molecular sciences*. 2019;20(6):1475.
10. Vestita M, Filoni A, Congedo M, Foti C, Bonamonte D. Vitamin D and atopic dermatitis in childhood. *Journal of immunology research*. 2015;2015.
11. Solak B, Dikicier BS, Celik HD, Erdem T. Bone Mineral Density, 25-OH Vitamin D and Inflammation in Patients with Psoriasis. *Photodermatology, photoimmunology & photomedicine*. 2016;32(3):153-60.
12. Bergler-Czop B, Brzezińska-Wcisło L. Serum vitamin D level—the effect on the clinical course of psoriasis. *Advances in Dermatology and Allergology/Postępy Dermatologii i Alergologii*. 2016;33(6):445-9.
13. de Tena JG, Abejón L, Horcajo P. Vitamin D insufficiency. *N Engl J Med*. 2011;364:1378.
14. Taylor W, Gladman D, Helliwell P, Marchesoni A, Mease P, Mielants H. Classification criteria for psoriatic arthritis: development of new criteria from a large international study. *Arthritis & Rheumatism: Official Journal of the American College of Rheumatology*. 2006;54(8):2665-73.
15. Feldman S, Krueger G. Psoriasis assessment tools in clinical trials. *Annals of the rheumatic diseases*. 2005;64(suppl 2):ii65-ii8.
16. Salaffi F, Ciapetti A, Carotti M, Gasparini S, Gutierrez M. Disease activity in psoriatic arthritis: comparison of the discriminative capacity and construct validity of six composite indices in a real world. *BioMed research international*. 2014;2014.
17. Mattozzi C, Paolino G, Richetta AG, Calvieri S. Psoriasis, vitamin D and the importance of the cutaneous barrier's integrity: an update. *The Journal of dermatology*. 2016;43(5):507-14.
18. Gisondi P, Rossini M, Di Cesare A, Idolazzi L, Farina S, Beltrami G, et al. Vitamin D status in patients with chronic plaque psoriasis. *British Journal of Dermatology*. 2012;166(3):505-10.
19. Orgaz-Molina J, Buendía-Eisman A, Arrabal-Polo MA, Ruiz JC, Arias-Santiago S. Deficiency of serum concentration of 25-hydroxyvitamin D in psoriatic patients: a case-control study. *Journal of the American Academy of Dermatology*. 2012;67(5):931-8.
20. Chandrashekar L, Kumari GK, Rajappa M, Revathy G, Munisamy M, Thappa D. 25-hydroxy vitamin D and ischaemia-modified albumin levels in psoriasis and their association with disease severity. *British Journal of Biomedical Science*. 2015;72(2):56-60.
21. Myśliwiec H, Kiluk P, Żelazowska-Rutkowska B, Baran A, Milewska J, Myśliwiec P, et al. Vitamin D deficiency in psoriatic patients in north-east of Poland. *Przegląd Lekarski*. 2016;73(9):610-4.
22. Ibrahim AM, Altamimy HM, Moneer M, Abdul-Hamied H. Measurement of vitamin (d) and its relation to psoriatic arthritis patients. *AAMJ*. 2013;11(2):292-304.
23. Bertrand KA, Giovannucci E, Liu Y, Malspeis S, Eliassen AH, Wu K, et al. Determinants of plasma 25-hydroxyvitamin D and development of prediction models in three US cohorts. *British journal of nutrition*. 2012;108(10):1889-96.
24. Mattozzi C, Paolino G, Salvi M, Macaluso L, Scarnò M, Calvieri S, et al. Correlation between plasmatic levels of vitamin D and PASI score. *Giornale Italiano di Dermatologia e Venereologia: Organo Ufficiale, Società Italiana di Dermatologia e Sifilografia*. 2017;153(2):155-60.