International Journal of Computational and Experimental Science and ENgineering (IJCESEN)

Vol. 8-No.3 (2022) pp. 59-64
http://dergipark.org.tr/en/pub/ijcesen

ISSN: 2149-9144

Research Article

The Relationship of IL 17a, Vit-D Levels and some Biochemical Markers with Psoriasis and the Effect of Oral Vitamin D Supplementation on Clinical Amelioration of the Disease

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Article Info:

DOI: 10.22399/ijcesen.1111117
Received : 29 April 2022
Accepted : 15 July 2022

Keywords

Psoriasis
Total cholesterol
Vit-D
RBS

Abstract:

The aim of the study was to measure vitamin D levels before and after giving specific doses of it. Patients with psoriasis have an imbalance in vitamin D levels, as vitamin D levels have been correlated with the level of disease progression. Psoriasis incidence rates after administration of vitamin D at a dose of 1 month every day 2000 IU, then the second and third month every week 10,000 IU for period a 3-month indicate that the size of the affected area did not expand or stopped expanding. Also in our study, interleukin-17 levels and lipid profile showed some changes, indicating that high levels of vitamin D may reduce inflammation or inflammatory diseases by contributing to immune system activation. There were notable changes in average lipids and the effect was likely caused by changes in vitamin D levels, which play an important role in lipid metabolism. There was also a decrease in calcium levels.

1. Introduction

In general, Psoriasis is very much an inflammatory skin disease caused by the immune system. Excessive proliferation or expansion with incomplete or partial differentiation of epidermal keratinocytes in affected subjects and reduced keratinocyte apoptosis characteristic of psoriasis lesions, associated in both dermis and epidermis with inflammatory cell infiltrate. The most common method for determining the severity and degree of psoriasis is to utilize the Psoriasis Area and Severity Index. Vitamin D and its receptor are involved in keratinocyte growth and proliferation, dermal immune system homeostasis, and apoptosis. Many immune response cell types not only express receptors of Vitamin D, but it also has all these enzymatic machines for 1,25- dihydroxy vitamin D synthesis; these cells-related synthesis sites are of major importance to regulate and control various immune responses [1, 2]. Psoriasis presents clinically in a variety of ways. Clinical type is not a predictor of illness severity or course; nonetheless, clinical type is a critical determinant in determining the treatment regimen [3].

The genesis of psoriasis is complicated, with a complex interaction between the immune system and two essential elements determining the disease's start and progression: environmental conditions and genetic tendency. While one-third of persons with psoriasis have a first-degree ancestor who also has the condition, the way the disease presents is influenced by environmental variables. Numerous factors, including physical trauma, psychological stress, medications, food, and infections, may contribute to the disease's onset [4]. These substances can cause keratinocytes (KCs) to produce cytokines include and consist of interleukin-17A (IL-17A), and also tumor necrosis factor-alpha (TNF-), which then cause local skin macrophages and dendritic cells to become activated (DCs) [5, 6]. The generation of type I interferons is a sign of pDC activation, which is essential for the creation of the psoriatic plaque (IFN- and IFN-). Type I IFN signaling is involved in Th1 and Th17 development and function, as well as the generation of IFN- and interleukin IL-17A, respectively, and promotes myeloid dendritic cell (mDC) phenotypic development [7, 8].

In this study, 110 subjects with varying degrees of disease activity (55 Vitamin D deficiency in men and 55 Vitamin D deficiency in women with psoriasis) who are matched for gender. Vit.D, IL17A and some biochemical markers will be measured in psoriasis patients. The study was conducted in Baghdad Governorate / Medical City Hospitals / Bab Al-Moadham.The tests indicated below, on the other hand, shall be performed in accordance with the manufacturer's modus operandi (kit user handbook). Serum Vit.D Test, Serum Interleukin 17A, Serum HDL, Serum TC, Serum Tg, Serum Ca, Serum LDL, Serum RF, and hsC-RP are some of the assays available.

2. Materials and Methods

2.1 Equipment's and Apparatuses

The following is a list of the equipment and apparatus that were used throughout the research. Centrifuge, Micropipettes, Tips (blue, yellow), Automatic Elisa Reader, Gel tube , Plain Tubes, The Cobas e 411 analyzer, Incubator, Centrifuge tube, Water path , Auto Vortex. The kits that used in study; Vitamin D, IL 17, Total cholesterol, Triglyceride, HDL, hs-CRP, Calcium, VLDL, LDL.

2.2.1 Measurement of interleukin 17A

This work made use of the sandwich enzyme-linked immune-sorbent assay (ELISA) technology. Anti-IL-17A antibody was used to pre-coat 96-well plates. As detecting antibodies, anti-IL-17A antibodies conjugated to biotin were utilized. After cleaning the wells with wash buffer, the standards in the kit, test samples (patients sample), and biotin labelled detection antibody were added. Unbound conjugates were removed using wash buffer after the addition of HRPS streptavidin. HRP enzymatic activity was observed using TMB substrates. HRP accelerated the reaction of TMB, resulting in a blue product that's become yellow when exposed to an acidic solution provider. The yellow density has a direct relationship with the amount of IL-17A caught in the plate. Examine the Outside Diameter (O.D.). The concentration of IL-17A may then be measured using and take place in a microplate reader and absorbance at 450 nm.

2.2.2 Measurement of 25 hydroxyvitamin D

This assay is designed to measure total 25OHVD in human serum and plasma in a quantitative manner. This test, is intended to aid in the determination of vitamin D deficiency. The Cobas e 411 immunoassay analyzer is compatible with the electro chemiluminescence binding assay.

2.3 Statistical Analysis

(SPSS) version 25 and the XLSTAT add-on for Microsoft Excel 2010 software were used for all analyses. The t-test for students was performed to compare the mean of the various groups. Pearson's correlation test and we were used to evaluate how the different biomarkers were related to each other. All tests were two-sided, and the results are reported as means + standard deviations, medians, or 95 percent confidence ranges for odd ratios Statistical significance was defined as a P-value of less than 0.05.

3. Results

Main aim is to study the frequency and duration of psoriasis and the prevalence of infection for the entire group of patients who joined the study, as shown in Table 1 and Figure 1. The majority of the patients in the research had been sick for more than seven years. Also, the frequency and percentage of the age distribution (study group) for the whole group of psoriasis patients, which shows after conducting the statistical analysis that the peak incidence of psoriasis was between the ages of 28-42 years, and this means that the ratio is 36.43 % (48 of 110 patients; 17.27 % - 26.36 %) as shown in Table 1.

Table 1 *The table shows, after statistical analysis, the peak incidence of psoriasis*

Duration of Psoriasis (Year)	**Frequency**	**Percent**
< 7	9	8.18 %
7 - < 14	15	13.63 %
14 - < 21	17	15.45 %
21 - < 28	21	19.09 %
28 - < 35	19	17.27 %
35 - < 42	29	26.36 %
Total	110	100.00 %

The frequency and percentage of use of vitamin D in our study was mentioned in order to know vitamin D effected. In our study, the mean values (±SD) of chemical parameters measured for a whole group of patients before conducting the study and after this step we giving VD supplementation, then we again measured biochemical tests.

3.1 The Parameters of Study before the Supplement with Vitamin D

The mean values (±SD) of chemical parameters measured for a whole group of patients before giving

vitamin D supplementation, then we again measured biochemical tests.

3.1.1 The results in men and women before for of age, Vit. D and IL-17A

We obtained the mean value in men and women for of age (33.547 ± 8.748, 40.784 ± 7.946 year, respectively), serum concentrations vitamin D (12.843 ±3.281, 9.647 ±4.758 ng/ml, respectivily), IL-17A (162.533 ±19.859, 155.858 ±17.731 pg/ml, respectively) as shown in Table 2 and Figure 2 which indicated the effect of vitamin D levels, total lipids and triglycerides in psoriasis.

Table 2 *The mean age, Vit.D and IL-17 in men and women before giving vit-D*

Parameter	Men group Mean±SD = 55	Wemon group Mean±SD = 55
Age (Year)	33.547 ± 8.748	40.784 ± 7.946
25OHVD (ng/ml)	12.843 ±3.281	9.647 ±4.758
IL-17A (pg/ml)	162.533 ±19.859	155.858 ±17.731

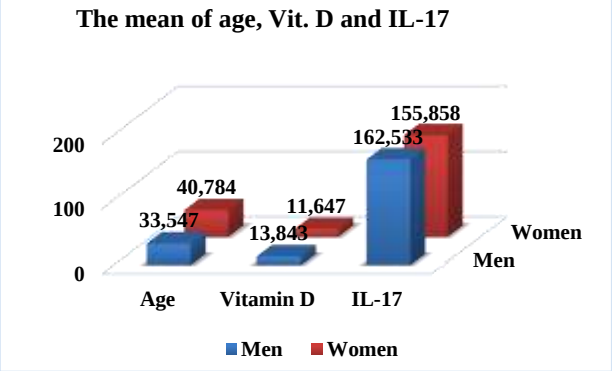

Figure 1 *The mean age, vitamin D and IL-17A with psoriasis*

3.1.2 Lipid profile (after) in patients with psoriasis

Also, the mean values (±SD) of chemical parameters measured for a whole group of patients before giving vitamin D supplementation, then we again measured biochemical tests. We obtained the mean value of men and female for serum concentrations of total cholestrol (252.758 ± 13.867 and 144.637 ± 19.285 respectivily), triglyceride (189.647 ± 16.975 and 108.731 ± 10.638 mg/dL respectivily), HDL (54.736 ± 18.758 and 62.845 ± 11.930 mg/dL respectivily), LDL (114.648 ± 24.869 and 128.849 ± 25.302) and VLDL (24.741 ± 3.648 and 29.957 ± 7.834 respectivily), as shown in Table 2 which indicated to dicrease lipid profile in patients with psoriasis and effect of vitamin D levels on total cholestrol and triglycerides in psoriasis

Table 3 *The mean of lipid profile in men and women before giving vit-D*

Parameter	Men group Mean±SD = 55	Wemon group Mean±SD = 55
Total cholesterol	252.758 ± 13.867	144.637 ± 19.285
Triglyceride	189.647 ± 16.975	108.731 ± 10.638
HDL	54.736 ± 18.758	62.845 ± 11.930
LDL	114.648 ± 24.869	128.849 ± 25.302
VLDL	24.741 ± 3.648	29.957 ± 7.834

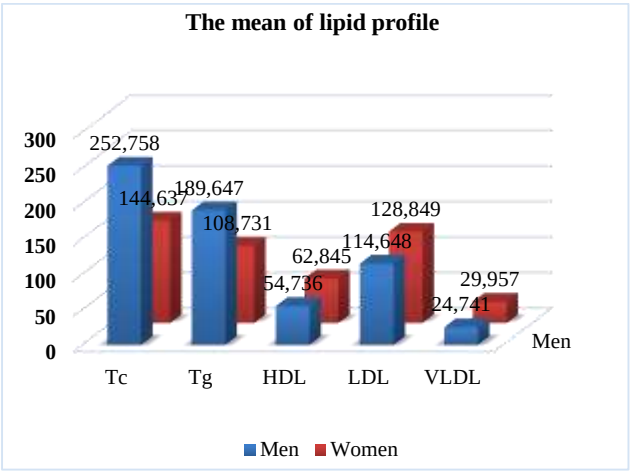

Figure 2 *The mean lipid profile with psoriasis*

3.1.3 The calcium, hs-CRP and RPP (after) in patients with psoriasis

We obtained the mean value for serum concentrations of calcium (10.318 ± 2.496 and 8.759 ± 1.109 mg/dL respectivily), hs-CRP (6.854 ± 0.856 and 11.843 ± 1.059 mg/dL respectivily), RPP (2.703 ± 0.275 and 3.041 ± 0.917 mg/dl respectivily), as shown in Table 3. Which indicated to staiblty of calcium in men and women, while increase hs-CRP in patients women with psoriasis and within normal in men. The rate of progression of psoriasis (RPP) was more in women than men.

3.2 The Parameters after the Supplement with Vit-D

To meet our study's objective, after giving vitamin D for three months to men (the first month every day 2000 IU, then second and third month every week 10000 IU period 3 month) the mean values (±SD) of chemical parameters of the group of psoriasis patients were measured.

Table 4 *The mean of calcium and C-RP in men and women before giving vit-D*

Parameter	Men group Mean±SD = 55	Wemon group Mean±SD = 55
Calcium (mg/dl)	10.318 ±2.496	8.759 ±1.109
hs-CRP (µg/ml)	6.854 ± 0.856	11.843 ± 1.059
The rate of progression of psoriasis (RPP)	2.703 ± 0.275	3.041 ± 0.917

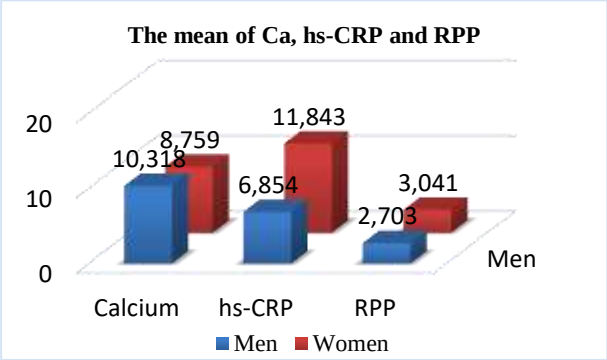

Figure 3 *The mean Ca, hs-CRP and RPP with psoriasis*

3.2.1 The age, Vit. D and IL-17A (after) in patients with psoriasis

We obtained the mean value for age (17.681 ±5.562 and 19.845 ± 5.689 mg/dL respectivily), serum concentrations vitamin D (34.69 ± 10.47 and 41.23 ± 9.06 respectivily) and IL-17A (186.74 ± 23.739 and 177.803 ± 19.264 respectivily) as shown in Table 4. Which indicated to little increase in age of men and women, while clearly increase vitamin D and IL-17A in patients men and women with psoriasis. This indicateted to stoping spread psoriasis by improvement of vitamin D levels and IL-17 in psoriasis patients.

Table 5 *The mean of age, Vit.D and IL-17 in men and women after giving vit-D*

Parameter	Men group Mean±SD = 55	Wemon group Mean±SD = 55
Age (Year)	17.681 ±5.562	19.845 ± 5.689
25OHVD (ng/ml)	34.69 ± 10.47	41.23 ± 9.06
IL-17A (pg/mL)	186.74 ±23.739	177.803 ±19.264

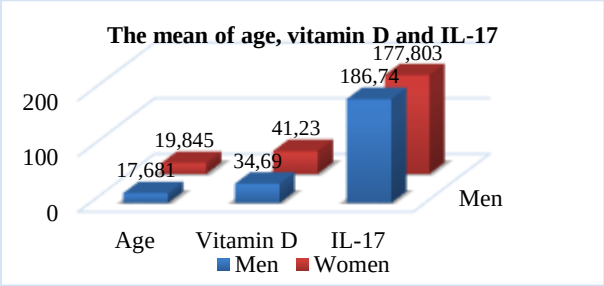

Figure 4 *The mean age, vitamin D and IL-17A (after) with psoriasis*

3.2.2 The lipid profile (after) in patients with psoriasis

The mean value in men women for serum concentrations of total cholestrol (158.638 ± 21.689 and 165.951 ± 16.063 respectivily), triglyceride (113.301 ± 11.264 and 96.974 ± 12.863 mg/dL respectivily), HDL (63.748 ± 12.690 and 55.070 ± 14.073 mg/dl respectivily), LDL (104.073 ± 18.073 and 107.253 ± 18.073 respectivily) and VLDL (26.542 ± 5.783 and 23.950 ± 5.073 respectivily), as shown in Table 5. Which indicated to change in lipid profile toward decrease. The change occur due to increased lipids metabolism through improvement vitamin D levels and therefore arrows with stopping *spread psoriasis patients.*

Table 6 *The mean of lipid profile in men and women after giving vit-D*

Parameter	Men group Mean±SD = 55	Wemon group Mean±SD = 55
Total cholesterol	158.638 ± 21.689	165.951 ± 16.063
Triglycerde	113.301 ± 11.264	96.974 ± 12.863
HDL	63.748 ± 12.690	55.070 ± 14.073
LDL	104.073 ± 18.073	107.253 ± 18.073
VLDL	26.542 ± 5.783	23.950 ± 5.073

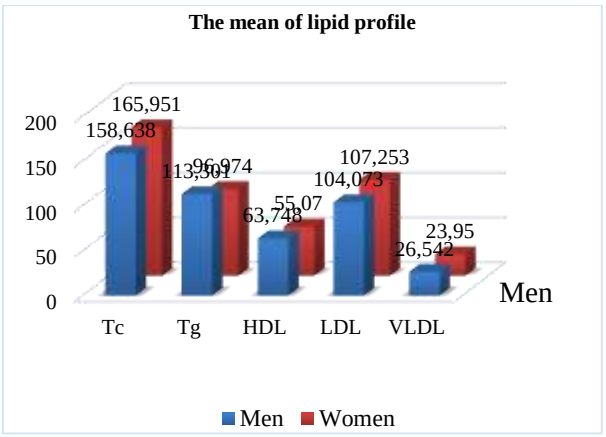

Figure 5 *The mean lipid profile (after) with psoriasis*

3.2.3 The calcium, hs-CRP and RPP (after) in patients with psoriasis

We obtained the mean value for serum concentrations calcium (9.748 ± 1.364 and 9.472 ± 1.999 mg/dL), hs-CRP (7.063 ± 0.964 and 8.903 ± 2.038 mg/dL) and RPP (4.047 ± 1.063 and 3.997 ± 2.096 respectivily), as shown in Figure 6 and Figure 7 which indicated to staiblty of calcium in men and women, while normality of hs-CRP in patients men and women with psoriasis. The rate of progression of psoriasis (RPP) was normal in women than men.

4. Discussions and Conclusions

Vitamin D levels, have been linked to the rate of disease development in psoriasis patients. The rates of developing psoriasis after giving vitamin D at a dose of 50000 weekly indicated that the size of the affected area did not expand or stopped expanding. Also in our study, the levels of interleukin-17 and SRB showed some changes, which indicates that high levels of vitamin D may reduce inflammation or inflammatory diseases by contributing to the activation of the immune system.

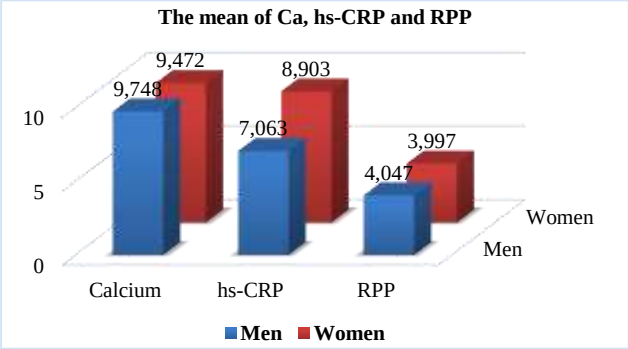

Figure 6 *The mean Ca, hs-CRP and RPP (after) with psoriasis*

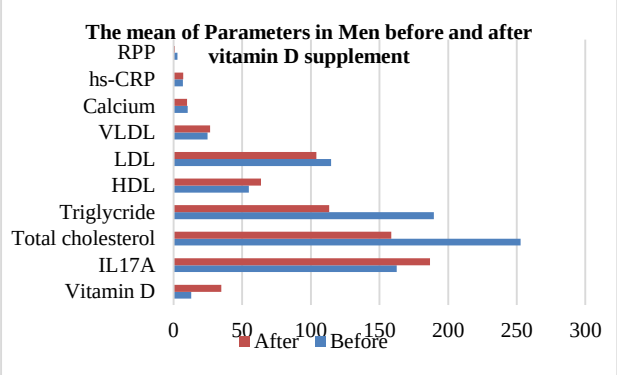

Figure 7 *The difference between the study means in men before and after vitamin D administration*

Lipid levels have an impact. Changes in vitamin D levels, which play a key role in lipid metabolism, are likely to be the cause of the effect. The amount of calcium in the body also increased.

Vitamin D is helpful for plaque-type psoriasis when / used applied directly to the human skin. As a psoriasis disease adjuvant, oral vitamin-D supplementation could be beneficial. The current state of knowledge about the use of oral vitamin D for psoriasis treatment is critical [9]. The immune system causes psoriasis, which is an inflammatory skin disease. In psoriasis lesions, hyperproliferation of epidermal keratinocytes is both the dermis and the epidermis show signs of inflammatory cellular infiltration. Vitamin D is produced naturally on the skin by exposure to sunlight. Vitamin D, has recently been linked to the pathogenesis of a variety of skin illnesses, including psoriasis. On multiple cases, low vitamin D levels have been associated to psoriasis. Vitamin D (Vit.D) has emerged as an essential and basic local therapeutic option in the treatment/ therapeutic of psoriasis due to its role in keratin cells reproduction and maturation. To date, successful psoriasis therapy based on the adequate dietary vit-D intake or oral vit-D the supplementation has remained an unmet clinical that requirement to human, evidence and certain of its therapeutic benefits is still being contested [10]. Our results showed that psoriatic patients had poorer vitamin D levels than healthy controls, adding to the expanding body of evidence relating vitamin D levels to the duration of psoriasis. Our study's observational nature, as well as the small number of patients who received biological immunosuppressive medication, are both disadvantages. More observational and randomized-controlled trials are needed to back up our findings [11]. According to studies, the cytokine, (IL-17A), interleukin-17A is involved in the pathogenesis of a number of immunoinflammatory diseases, including psoriasis, psoriatic arthritis, and rheumatoid arthritis. Although, T helper type 17 cells create the majority of IL-17A, it is also produced and synthesized by a special group of other cell types in the human body, including CD8+ T cells and T cells. of blood clots. In target cells involving bioprocesses including keratinocytes and fibroblasts, IL-17A increases the expression of multiple genes associated with inflammation, thereby increasing the production of cytokines and their derivatives, antimicrobial peptides, chemokines and other mediators that contribute to and participate in Clinical disease characteristics. Inhibitors of IL-17A in the human body resulted in rapid downregulation of the psoriasis gene signature and high clinical response rates in patients with moderate to severe plaque psoriasis. Important in the etiology of psoriasis. Alternatively, IL-17A inhibitors enhanced clinical response rates in psoriatic arthritis and rheumatoid arthritis to a lesser extent than placebo, indicating that IL-17A is either required in a subgroup of subjects or plays a minor role. In rheumatoid arthritis. More information on the involvement of IL-17A in various illnesses is expected to come from ongoing phase 3 clinical studies [12]. Plaque psoriasis' exact pathophysiology is unknown, however, it is most likely caused by environmental and genetic factors that promote dysregulated innate and adaptive immunity in the skin. Interleukin (IL)-17A is a cytokine that aids in the defense of the host against external bacteria and fungus. A growing body to evidence suggests that IL-17A, has a role in the development of psoriasis. While Th17 cells produce the most IL-17A, neutrophils, mast cells, and Tc17 cells also produce it. In psoriatic lesions, each of these cell types can be present [13]. Psoriasis is a common skin disease that his affects from 2% to 3% of the population. The prevalence of the condition in the general population or humans is affected by biochemical factors, as well as genetic, viral, environmental, infectious and immune factors, endocrine and psychological factors, as well as addiction to some types of drugs and alcohol. Psoriasis has been recognized and defined as a systemic disease of the skin with a variety of abnormalities and consequences affecting the skin

and multiple organs in the last years of the last century. People with psoriasis often have dyslipidemia as a comorbidity, meaning changes in their levels. In the early or first third of the last century, researchers were studying lipids on the surface of psoriatic skin, stratum corneum lipids, lipid metabolism in humans, epidermal phospholipids, serum lipids (total lipids), cutaneous low-density lipoproteins, oxidative stress, and the associations between Clinical symptoms, inflammation criteria, and lipids. Disease parameters. According to research, psoriasis is an immunometabolic disease [14]. We recommend taking groups that include patients without psoriasis also in conducting the same studies in the future to identify changes, identify problems and reach the best results.

Author Statements:

- **Ethical approval:** The conducted research is not related to either human or animal use.
- **Conflict of interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper
- **Acknowledgement:** The authors declare that they have nobody or no-company to acknowledge.
- **Author contributions:** The authors declare that they have equal right on this paper.
- **Funding information:** The authors declare that there is no funding to be acknowledged.
- **Data availability statement:** The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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