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Estimation of Serum Vitamin D and Zinc Level among Psoriatic Patients

[1]Dr. Salim Hussein Hassan Al-Greti & [2]Jaafar Khalaf Ali

[1,2]Community health Dept. Karbala Technical Institute, Al-Furat Al-Awsat University, kufa, Iraq.

Address For Correspondence:
Salim H. H. AL-Greti, Community health Dept. Karbala Technical Institute, Al-Furat Al-Awsat University, kufa, Iraq.
Tel: 009647702638133; E-mail: sa.hussein1996@gmail.com

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ABSTRACT

Background: Psoriasis is chronic skin diseases that infect about 3 % of the world population. It affects by many factors such as vitamin D that have main immunomodulatory effects in psoriasis, in addition trace elements specially zinc element. **Objectives**: To evaluate vitamin D and zinc serum levels in patients with psoriasis. **Methods:** A cross-sectional study was conducted including 18 psoriatic patients and 18 healthy as control groups. Vitamin D and zinc serum levels were measured. **Results**, the result show lowering vitamin D and zinc element in psoriatic patients as compared with control subjects at $P < 0.05$. **Conclusion**: It's concluded vitamin D and zinc were decreased significantly in psoriatic patients.

INTRODUCTION

Psoriasis is a skin autoimmune disease in which genetic and environmental issues have a major role. Its name derived from Greek term„ psora‟ which is mean „itch‟. Psoriasis is inflammatory, dry, non-contagious, and ugly skin illness, which can implicate entire system of individual (Ashwin *et al*., 2011). The most frequently affected sites are the tips of finger, scalp, and toes. In this disease, the skin has scaling like flakes named psoriatic plaques as a result of rapid and too much proliferation of epidermis cells which look like skin of fish skin and finally peels off as exfoliation (Rahman and Elder, 2005). Psoriasis exists as several morphological variants like plaque, pustular, and flexural. Some other variety also exist like nail psoriasis, drug induced, inverse psoriasis, psoriatic arthritis and seborrheic. Approximately ninety percent of affected patients have plaque psoriasis, categorized by well-defined round or oval panels that vary in size and often unite (Griffiths and Barker, 2007).

Vitamin D (25-hydroxyvitamin D) is a hormone that stimulate by cutaneous contact to ultraviolet B radiation UVB (Maia *et al*., 2007). It acts on calcium homeostasis, bone metabolism and has immune flexible functions that have been newly documented. Vitamin D inhibits creation, induce fatal differentiation of human keratinocytes and display immunomodulation properties (Marques *et al*., 2010). Some studies have demonstrated a relationship between vitamin D insufficiency and psoriasis (Szodoray *et al*., 2008; Orgaz-Molina *et al*., 2012). Vitamin D has pleotropic functions; it acts as a hormone by regulatory calcium homeostasis as well as utilizing autocrine/paracrine effects on tissues. Moreover, its local effects; calcitriol may also act in psoriasis through its immunomodulatory properties through hindering T-cell multiplying and Th1 progress, controlling antigen presenting cell "APCs" function, making hypo responsiveness to antigen, preventing manufacture of IL-2, IL-17, IL-8 and interferon-γ, as well as increasing the production of IL-10 and regulatory T cells (Arnoson *et al*., 2007; Adams and Hewison, 2010). There are many studies on high-dose vitamin D in the psoriasis treatment, while systemic administration of this vitamin for the treatment of psoriasis might be limited by its toxicity. Small number of trials shows the effectiveness and care of vitamin D metabolites in the cure of psoriasis and psoriatic arthritis (Gaal *et al*., 2009; Perez *et al*., 1996; Hukins *et al*., 1990).

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Zinc (Zn) is second to iron as the most abundant trace component in the body. More than 300 metal enzymes occur in all six categories of enzyme systems. Some enzymes, such as Cu and Zn superoxide dismutase, structural stability is confirmed in zinc protein binding and catalytic action of the enzyme by the active copper site. Sign and symptom of the zinc deficiency include increased occurrence of infections, possibly related to change in immune function; diarrhea; skin lesions; alopecia; eyesight defect and other adverse clinical outcomes (Carl *et al*., 2012). About fifty years ago, progress has been made about association of zinc with numerous skin pathology (Bibi and Cohen, 2006). Zinc stabilizes the cell membrane, protect their integrity by reducing the formation of free radicals and prevention of lipid peroxidation, zinc is also required for immune system function, protein synthesis and wound healing (Coleman, 1992 ; Jen *et al*., 2008). The present study was aimed to evaluate vitamin D and zinc levels in blood of psoriasis patients.

MATERIALS AND METHODS

All Patients with psoriasis who included in this study were attending the outpatient clinic of the Dermatology department in Hilla hospital. The study was performed on 18 (11 male and 7 female) psoriatic patients and 18 (10 male & 8 female) non-psoriatic healthy individuals (controls). A paper of information was filled from each patient who includes name, age, sex, and presence of other autoimmune disease, occupation, and family history of psoriasis. Blood sample (5 ml) was taken from each patient and control groups to evaluate the levels of vitamin D by (i- Chroma technique) and Zinc according to the procedure that provided with the kit (Spectrum Com. Egypt). The study results were calculated as mean ± S.D at p value less than 0.05 significant.

Results:

The results of this study were pointed to high incidence of psoriasis in male (61%) versus in female was (38.9 %), and results show 13 (72%) cases out of 18 at age less or equal 40 years and only 5 cases (28%) were above 40 years, also the control group was in the same age range as illustrated in table (1). Also the results show the mean value of vitamin D level was decrease significantly in psoriasis patients (11.81 ng/ml) as compare with control (29.55 ng/ml) as illustrate in table (2), and in same time the results of zinc concentration appeared low level in patients (73.01 mg/dl) as compared with control (94.88 mg/dl) at $P < 0.05$ as explained in table (3).

Table 1: the frequency of gender and age among patients and control

Gender		
	Frequency No.	Percentage %
Patients		
Male	11	61.1%
Female	7	38.9%
Control		
Male	10	55.5%
Female	8	44.5%
Age		
Patients		
<40	13	72%
>40	5	28%
Control		
<40	8	50%
>40	8	50%

Table 2: the mean value of vitamin D in psoriatic patients and control

Vitamin D	Mean (ng/ml)	SD
Patients	11.81	4.36
Control	29.55	7.52
P = 0.017		

SD: standard deviation

Table 3: Comparison of zinc level between patients and control

Zinc	Mean (mg/dl)	SD
Patients	73.01	15.11
Control	94.88	7.71
P = 0.005		

Discussion:

The present study showed the vitamin D level was decreased significantly in patients with psoriasis as comparing with healthy control, and this may be as a result of scalping of skin cells that lead to exposure to sun light which is a main source of vitamin D is few. Decreased level of vitamin D has great effects in the pathogenesis of psoriasis. It acts directly on the receptor of vitamin D to control keratinocyte growth and distinction, but also has an important effect on immune roles of dendritic cells and T lymphocytes (Maria *et al*.,

2014; Zuchi *et al*., 2015). Vitamin D3 effect on "the production of interleukin IL-2 and IL-6, blocks interferon gamma transcription and granulocyte-macrophage colony-stimulating factor mRNA, as well as inhibits cytotoxic T cells, B cells and natural killer cell action" (Gisondi *et al*., 2012). It also plays an important role as an immune modulator in many dermatological diseases, as in psoriasis, atopic dermatitis, vitiligo, and alopecia (Ricceri *et al*., 2013). The ancestor of vitamin D is 7-dehydrocholesterol that is located in the membranes of keratinocytes of the basal and spinous layer of epidermis (Al-Jebory, 2012). By the action of UVB (wavelength between 290 and 315 nm), through a photochemical reaction, the B ring of 7-dehydrocholesterol is destroyed to form cholecalciferol (pre-vitamin D3), which is then transformed first to 25-hydroxyvitamin D (25OHD) by the enzymatic reactions and then to 1, 25-hydroxyvitamin D or (calcitriol) which is the active form of vitamin D (Ozturk *et al*., 2001). Physiologically, the active formula of vitamin D and its receptor control the distinction and proliferation of keratinocytes, the balance of the cutaneous immune system and the process of apoptosis. The 1, 25(OH) D has been shown to exert anti-proliferative effects on keratinocytes (Margit *et al*., 2015). Other study was conducted on the psoriasis shown a relationship between vitamin D and psoriasis by compared the levels of vitamin D in serum of psoriatic patients and controls that carried out by (Rocha *et al*., 2004) [24]. In the study done by Gisondi *et al.* 2012 show that the patients with psoriasis have a two times higher risk of vitamin D deficiency than healthy people. Ricceri *et al*. 2013 study found a vitamin D deficiency in 68% and 97% insufficiency in psoriatic patients, while in control group was only 10% with vitamin D deficiency and about 53% insufficiency. The results of this study agreement with many previous studies (Orgaz-Molina *et al*., 2012; Rocha *et al*., 2004; Tang *et al*., 2003) who stated vitamin D decreased significantly in patients with psoriasis as compared with control subjects.

Regarding zinc concentration, there is a study was designed to estimate the zinc level in serum of patients with psoriasis and its association with clinical types of disease, duration and surface area; the results has shown a low level of serum zinc among patients in a percent of 98% and only 4% among controls (Al-Jebory, 2012). In 2015 Margit, *et al*. who study the role of serum copper and zinc in pathogenesis of psoriasis were stated the mean value of serum zinc in severe Psoriasis is significantly low as compared to Controls. A current study was concluded the levels of vitamin D and zinc in psoriatic patients' serum were decreased significantly.

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