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Comparison of Serum Zinc Levels Between the Patients with Acne Vulgaris and Healthy Volunteers.

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ABSTRACT

Acne vulgaris is a common chronic inflammatory disease of the skin which is usually seen in adolescence. Zinc is a trace element which has important roles in many cellular functions and its deficiency can result in the development of acne-like papulo pustular lesions. The aim of this study was to compare serum zinc levels between the patients with mild to moderate acne and healthy volunteers. This case control study included 60 patients with mild to moderate acne according to Global Acne Grading System. Our control group consisted of 120 healthy volunteers who had been referring to the laboratory for routine tests. Serum zinc levels in the case and control groups were measured and compared with each other. The mean serum zinc levels in the case and control groups were 81.96±16.97 and 87.13±19.59µg/dl respectively, which did not show any significant difference (p=0.083). The mean serum zinc level was 79.5±14.6 in the women and 83±21.1 µg/dl in the men with acne vulgaris which had no significant difference (p=0.14). Also, the mean serum zinc levels in the patients with mild acne and patients with moderate acne were 86.7±16.8 and 79.9±16.8 µg/dl respectively which revealed no significant statistical difference (p=0.16). Considering the lower serum zinc levels in the acne patients, compared to healthy volunteers, use of zinc supplements can increase the treatment success rate.

Keywords: Zinc, Acne vulgaris, Trace element

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INTRODUCTION

Acne vulgaris is regarded as a common chronic inflammatory disease of the skin which is commonly seen in adolescence [1]. The condition may lead to psychological problems such as impaired social contact, anxiety and lack of confidence [2].

Zinc is a trace element which exisits in several metalloenzymes and is required for cellular functions such as DNA and RNA synthesis, protein synthesis, cell division and normal growth [3]. Zinc is essential for the function of many hormones and is found in the structure of insulin, growth hormone, sex hormones, and several other hormones. It has important roles in immune function and normal keratinization, and has antioxidant and anti-inflammatory properties [4, 5]. Zinc deficiency is either a genetic or an acquired disorder. The genetic form can result in acrodermatitis enteropathica, a disease with scaly dermatitis, psoriasiform or annular lesions, papulopustules, vesiculobulla and erosions.

Acquired zinc deficiency can occur as a complication of malabsorption, chronic diseases, high phytate intake and alcoholism [6,7]. Zinc is found in abundance in meat and fish which is absorbed more readily than zinc from plant foods [8]. Use of zinc supplements has resulted in the improvement of the skin lesions, including papules and pustules, in zinc deficiency [9].

Results of some studies have revealed decreased serum zinc levels in the patients with acne vulgaris [10, 11].

Zinc has been used in acne valgaris with inflammatory lesions with different success rates [12-14].

There have been few studies on the relationship between serum zinc level and acne vulgaris. Considering the high prevalence rate of acne and its psychological and cosmetic consequences, we conducted this study to assess the relationship between serum zinc level and acne vulgaris.

MATERIALS AND METHODS

This was a case control study and included 60 patients between 15 and 40 years of age, with mild to moderate acne vulgaris. The patients had not received any treatment for acne vulgaris during the last 6 months before the study. Our control group consisted of 120 healthy volunteers who had been referring to laboratory for routine tests.

Our exclusion criteria were as follows: antibiotic therapy or use of zinc supplements during the last 6 months before our study, pregnancy, lactation, history of cancer, malabsorotion due to liver and pancreas disease and severe acne vulgaris.

The study was approved by Ethical Committee of Kurdistan University of Medical Sciences. After informed consent, the patients were examined by our dermatologist and according to Global Acne Grading System, patients with mild to moderate acne were entered into our study [15]. Serum zinc levels of the patients and healthy volunteers were measured by colorimetry method and compared with each other.

RESULTS

The mean serum zinc levels in the case and control groups were 81.96 ± 16.97 (Range: 38-128) and 87.13± 19.59(range: 51-142) µg/dL respectively, which showed no significant statistical difference (p=0.083). 18(30%) patients had mild and 42(70%) had moderate acne vulgaris. The mean duration of acne in the patients was 12.9±9.9 months (Table 1).

The mean serum zinc level was 79.5±14.6 µg/dL in the women and 83±21.1 µg/dL in the men with acne vulgris which had no significant statistical difference (p=0.14). Also the mean serum zinc level was 86.7±16.8 µg/dL in the patients with mild acne and 79.9±16.8 µg/dL in the patients with moderate acne which did not reveal any significant statistical difference (p=0.16).

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Table 1: Descriptive characteristics of the study groups

		Acne Group (60)	Control Group (120)
Age	Mean±SD	20.1±4.1	20.2±4.1
	Range	14-29	13-30
Gender	Female	38(63.3%)	76(63.3%)
	Male	22(36.7%)	44(36.7%)
Acne grade	Mild	18(30%)	-
	Moderate	42(70%)	-
Duration of acne (Months)	Mean(SD)	12.9±9.9	-
	Rang	2-48	

DISCUSSION

Large amounts of zinc are present in the skin. Zinc has essential roles in the human body metabolism [6]. In our study the mean serum zinc levels in the case and control groups were 81.96±16.97 and 87.13±19.59 µg/dL respectively. Although the mean serum zinc level in the patients with acne was lower than that in the control group, no statistically significant difference was detected between the two groups. In one study the mean serum zinc levels in the patient and control groups were 99.85±18.07 and 101.57±10.52 µg/dL which had no significant difference [16]. Kaymak in his study found lower serum zinc levels in the acne group compared to his control group [17]. In our study the serum zinc level was 86.3±21.1 µg/dL in the men and 79.5±14.6 µg/dL in the women with acne which had no significant difference (p=0.14). Ghafarpour and his colleagues found serum zinc levels of 115.19±1.71 in the men and 104.54±2.72mg/dl in the women with ance vulgaris ($p<0.05$) [18].

In Michaelsson's study, 73 patients with inflammatory acne were evaluated for the zinc levels of serum, epidermis and dermis; and serum zinc levels of the men were similar to those of the women. Also there was no correlation between zinc levels of the serum and epidermis [19]. Amer and his colleagues found lower serum zinc levels in the acne patients in comparison to his control subjects [20]. Ozugus found a negative correlation between serum zinc level and severity of acne vulgaris [15]. Malnutrition, decreased absorption or increase excretion of zinc in feces or sweat and inflammation can result in zinc deficiency in the patients with acne vulgaris [21]. The beneficial effect of zinc on acne vulgaris can be related to its effect on neutrophil chemotaxis, bactericidal function and phagocytosis, complement fixation, metabolism of vitamin A and androgens, stabilization of macromolecules and lysosomes and regulation of inflammation [22, 23]. Retinol binding protein (RBP) synthesis is dependent on zinc. RBP is necessary for the transport of vitamin A to the tissues with consequent prevention of follicular obstruction [24]. In Michaelsson's study, patients with severe acne vulgaris had low levels of RBP [21]. Zinc is necessary for enzyme systems involved in androgen synthesis. Zinc can inhibit conversion of testosterone into DHT. This mechanism may also play a role in the prevention of acne vulgaris [25].

In our study serum zinc levels were within normal limits in the patients with acne vulgaris. It has been postulated that zinc can be accumulated and attached to a fixed chemical compound. Therefore its secretion to peripheral tissues and its use for metabolic functions will be impaired [26]. Zinc supplements have been used in acne vulgaris and different success rates have been **reported** [22, 23, 25-28].

CONCLUSION

Considering the lower serum zinc levels in acne patients and also lower serum zinc levels in the female compared to the male acne patients, use of zinc supplements may result in a more successful treatment of acne vulgaris.

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