

# Vitamin A and E Levels in Patients with Mild and Moderate Acne

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## ABSTRACT

**Objective:** Follicular hyperkeratinization and *Propionibacterium acnes* colonization are mainly responsible for the pathogenesis of acne. As the relationship between vitamin levels and skin diseases is not fully understood, plasma levels of vitamins A and E in resistant acne patients were evaluated in this study.

**Methods:** In this retrospective study, 96 resistant acne patients who were followed up in the dermatology outpatient clinic of Bezmalem Vakıf University Hospital between January 2015 and December 2015 were evaluated to determine plasma levels of vitamins A and E.

**Results:** A total of 96 acne patients and 50 age- and sex-matched control patients were analyzed. Vitamin E levels were not significantly different between the groups ( $p>0.05$ ), whereas vitamin A levels were significantly lower in the patient group than in the control group ( $p<0.05$ ).

**Conclusions:** Based on our results, we conclude that vitamin E plasma levels do not have a major role in the pathogenesis of acne. However, dietary foods rich in vitamin A may be recommended to these patients.

**Keywords:** Acne, vitamin A, vitamin E

## Introduction

Vitamins A and E are among fat-soluble antioxidants, and their deficiency causes various diseases. Vitamin A is necessary for epithelial differentiation and mucus secretion. Vitamin A is used topically and orally especially for diseases, such as acne vulgaris having a course of keratinization defects and patients highly benefit from it (1).

Alpha-tocopherol, a form of vitamin E, is a strong antioxidant found in plasma. It accumulates in lipoproteins circulating in blood and cell membranes and protects membranes, lipoproteins, and fatty acids from peroxidation reactions by reacting to molecular oxygen and free radicals (2). Studies investigating the importance of insulin resistance, vitamins, and food in etiology of acne have been previously conducted. In this study, it was aimed to determine the place of vitamin supplements that can be given to patients, who were nonresponsive to treatment having resistant, mild, and moderate acne, constituting the majority of daily outpatient clinic patients in the treatment of acne by investigating the levels of these vitamins.

## Methods

In our study, laboratory findings of 96 patients, who applied more than one time to the dermatology outpatient clinic of Bezmalem Vakıf University Hospital with the complaint of acne vulgaris between January 2015 and December 2015 and stated that they did not benefit from the treatment, were evaluated retrospectively by scanning their files. The patients having a known comorbid disease, receiving systemic isotretinoin treatment, who were pregnant and breast feeding, and in whom polycystic ovarian syndrome were detected in the blood values in order to determine the etiology of resistant acne vulgaris were excluded from the study. Fifty patients who applied to the outpatient clinic for diseases apart from acne and who were appropriate in terms of age and gender, without a comorbid disease and did not receive any drugs were

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included as control group. Written informed consent was obtained from the patients. No ethics committee approval was taken, as the files were scanned retrospectively from the system. The study was conducted in accordance with the terms of Declaration of Helsinki.

**Statistical analysis**

Statistically,  $p < 0.05$  values were accepted to be significant. The analyses were conducted with Statistical Package for the Social Sciences 15.0 for Windows (SPSS Inc., Chicago, IL, US). Numerical variables were given as mean and standard deviation. Kruskal-Wallis and Mann-Whitney U tests were used for the correlation between numerical variables.

**Results**

Ninety-six patients with acne and 50 patients as control group were included in our study. Sixty-five of the patients (67%) who took part in the study were female and 31 (33%) of them were male. Thirty-two patients (64%) of the control group were female and 18 of them (36%) were male. Ages of the patients taking part in the study were within 11-37 y. The mean age was  $21.82 \pm 5.05$  y in the patient group, and it was  $23.92 \pm 7.04$  y in the control group. The patients with acne were divided into two groups according to global acne grading as mild (6-18) and moderate (20-30). There were mild acnes in 43 patients (44.7%) and moderate acnes in 53 patients (55.2%).

Vitamin A level in the patient group was  $453.65 \pm 118.25$  (median value: 451.2) mg/L, whereas it was  $523.21 \pm 97.52$  (median value: 520.8) mg/L in the control group. There was a significant difference between mild, moderate patients and the control group ( $p = 0.034$ ). Vitamin E level in the patient group was  $12.52 \pm 3.61$  (median value: 11.5) mg/L, whereas it was  $13.6 \pm 3.47$  (median value: 12.0) mg/L in the control group. There was no statistically significant difference between mild, moderate patients and the control group ( $p = 0.092$ ).

Vitamin levels according to the intensity of acne are presented in Table 1. While vitamin A level in the group of moderate intensity acne was lower, there was no statistically significant difference between groups ( $p = 0.732$ ).

**Discussion**

Increased sebum production, *Propionibacterium acnes* (*P. acnes*) reproduction in the sebaceous glands and channels, and inflammation play a role in the etiology of acne. Inflammatory lesions can be superficial or deep. While superficial lesions occur mostly as papule and pustule, nodule development may be seen in deep lesions (3). Despite the use of topical and systemic antibiotic in the patients with mild and moderate intensity acne, some patients do not benefit from the treatment. In this study, it was aimed to discuss the place of vitamin A-rich food in the diets of patients with resistant, mild, and moderate intensity acne by determining the vitamin A level in these patients.

**Table 1.** Vitamin levels according to the severity of acne

	Mild	Moderate	Control	p
Vitamin A (mg/L)	461.78±89.78	437.09±79.93	523.21±97.52	0.034
Vitamin E (mg/L)	12.70±2.96	11.84±3.77	13.6±3.47	0.092

Vitamins A and E are among main fat-soluble antioxidants found in nature as food. Deficiencies of these vitamins cause many diseases. Furthermore, retinoids suppress epidermal cell differentiation and keratin production. When vitamin A is low, sebaceous glands grow, sebum secretion increases, and, in turn, there is an increase of *P. acnes* colonization. Therefore, the intensity of acne may increase as the level of vitamin A decreases. In our study, as the intensity of acne increased, it was not statistically significant even though the level of vitamin A decreased.

El Akawi et al. (4) and besides Ozuguz et al. (5) from our country have found the levels of vitamins A and E to be lower in patients with acne than in the control group. Furthermore, El Akawi et al. (4) have found the level of vitamin A was lower in the patients with severe acne than in the patients with mild acne. Meanwhile Ozuguz et al. have (5) found no relationship between the level of vitamin A and intensity of acne.

El Akawi et al. (4) have thought that plasma lipoproteins or retinol-binding proteins changes plasma concentration of vitamin A by affecting transport and absorption. Furthermore, they suggested that when they questioned the dietary habits of the patients in their studies, the patients having acne fed on diet with carbohydrates and fast food rather than vegetables, fruit, and meat (4).

Özüğuz et al. (5) have found the levels of vitamin E low in the patients with acne. El Akawi et al. (4) have suggested that the low level of vitamin E affects the patients with acne indirectly. It is also known that smoking causes lowness of vitamin E. Smoking patients were not included in our study. Therefore, we are of the opinion that we have not found a difference in the levels of vitamin E. We think that it is unnecessary to add vitamin E routinely to the diets of patients with acne.

The relationship of etiopathogenesis of acne with diet has been previously investigated in many studies. Siniavskii et al. (6) have investigated the content of diet in the young population with acne. They have shown that calorie-rich food, intake of daily carbohydrate more than necessary, and feeding with food having poor vitamin A and carotene content increase the intensity of acne.

Aksu et al. (7) from our country have conducted a study questioning the relationship with acne and diet. Diet habits of 2300 participants were asked. The prevalence of acne in the participants was 60.7%. It was seen that the patients without

acne had a healthier diet habit compared to those with acne. It was also seen that the frequent consumption of food such as candy, hotdog, hamburger, and cake was related with the increased risk of acne.

According to the results of our study, foods having low glycemic index and rich in vitamin A, such as sweet potato, carrot, spinach, black cabbage, turnip, winter squash, lettuce, tomato, leek, and grapefruit, can be recommended to a patient with acne. In our study, differing from other previously conducted studies, there were not any patients with severe acne in our patient group. Although we think that vitamin supplements and diet constraints are not sufficient for the patients with severe acne, vitamin A supplement can be given to treatment-resistant patients having mild or moderate acne.

A study displaying the effect of vitamin A supplement except oral isotretinoin in patients with acne has not been conducted yet. Studies showing the effect of oral vitamin A intake on acne can be conducted, and thus its effect can be investigated. The factor restricting our study was that the diet habits of the patients were not exactly known due to the retrospective design of it.

## Conclusion

Our study emphasizes the importance of diet for the patients with acne. Supplement of vitamin A can be given to patients who cannot sufficiently take it naturally and vitamin E is not needed. More comprehensive studies with more patients are necessary.

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**Ethics Committee Approval:** Authors declared that the research was conducted according to the principles of the World Medical Association Decla-

ration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

**Informed Consent:** Informed consent was obtained from patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

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