

Determination of serum levels of zinc in acne vulgaris patients: a case control study

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Background: Acne vulgaris is a dermatologic disorder with a wide variety of distribution and presentation. Its high prevalence and important cosmetic and psychological concerns focusing on contributing factors would be of great value for better approach and prevention of acne vulgaris. There are many articles that argue the role of some dietary and inflammatory factors in acne vulgaris. In this study, the serum levels of zinc in acne patients were determined and compared with healthy subjects.

Methods: In this age and gender matched case-control study, 200 consecutive subjects with and without acne (moderate-very severe) referring to Rasoul Akram Hospital, 2016, were enrolled, and their serum zinc levels were determined and compared across the groups.

Results: Serum zinc levels were alike across the groups ($P > 0.05$), and the severity of acne was not related to zinc level. The levels of zinc were significantly different between genders in the case group (men had lower levels). In female patients with acne, the level of zinc was inversely correlated with acne severity.

Conclusion: Zinc is not related to acne incidence or its grade, but men with acne have lower levels of zinc compared with women. Also, acne severity in women is inversely correlated with zinc level. It can be assumed that zinc supplementation may be a good trend in men with acne or alleviate the severity of acne in women, which needs more evaluation and work up.

Keywords: acne vulgaris, serum, zinc

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INTRODUCTION

Acne vulgaris is a common skin disorder with inflammation of sebaceous glands and an obstruction of follicular unit with keratin which leads to acne lesion formation especially in the chest, back, and face ¹⁻³. Genetic factors are considered the main contributing factors ⁴. Four related mechanisms include follicular proliferation and ruptures, sebum production, inflammation, and coryne-bacterium

presence ^{5,6}. Acne is usually seen in adolescence due to the sex hormone role in mid second decade of life ⁶⁻⁸. Aggravating factors for acne include androgens level, genetic, corticosteroids, chemical agents, and psychiatric factors ⁹⁻¹¹. Antibiotics such as tetracycline ¹²⁻¹⁴ and also retinoid ¹⁵ are the main therapeutic options. However, these modalities are effective in the treatment of patients. In some cases, the therapeutic outcomes are not favorable; in such cases, other etiologies such as mineral and

vitamin deficiencies are proposed to be important. Some micronutrients or inflammation-related factors like zinc, calcium, vitamin D, phosphorous, and CRP are among suggested markers. Taking into account controversies or limited number of studies relating to the subject¹⁶⁻²¹, we aimed to determine the serum level of zinc and compare it in acne patients with healthy subjects.

PARTICIPANTS AND METHODS

Participants and study design

In this age and gender matched case-control study, 200 consecutive subjects with and without acne (100 cases and 100 controls) in Rasoul Akram Hospital in 2016 were enrolled, and their serum zinc levels were determined by ELISA method and compared across the groups, based on acne severity. The control group was among health care personnel who had no acne in clinical examination. The severity was determined according to the following items:

- Mild acne: fewer than 20 comedones, or fewer than 15 inflammatory lesions, or a total lesion count lower than 30;
- Moderate acne: 20-100 comedones, or 15-50 inflammatory lesions, or a total lesion count of 30-125;
- Severe acne: more than five cysts, or comedone count greater than 100, or a total inflammatory count greater than 50, or a total lesion count greater than 125.

Statistical methods

Data analysis of data from 200 patients (100 subjects in each group) was done using SPSS software (version 24.0). The tests for comparisons were Independent Samples t-Test, Mann-Whitney-U, ANOVA, Kruskal-Wallis, and Pearson tests. The significance level was considered 0.05.

Ethical considerations

The written informed consent was obtained from all participants.

RESULTS

This case-control study was an age and gender matched one conducted on 200 participants (100 cases and 100 controls). In each group, 50 male and 50 female participants were enrolled. The mean age of the participants in the case and control group was 25.38 and 25.60 years old, respectively. In the case group, 27% of the patients had moderate acne, and 32% and 41% of the patients had severe and very severe acne, respectively. Table 1 shows the acne duration time among patients in the case group.

The level of zinc was not significantly different between two groups. Also, the level of zinc was not related to the patients' age ($P > 0.05$).

The zinc level was significantly different between males and females in the case group ($P = 0.0001$) (Table 2).

There was not any relationship between the

Table 1. The acne duration time among the acne patients

Group	Time				Total
	Less than 1 year	Between one to five years	Between five to ten years	More than ten years	
Case					
Count	34	27	18	21	100
% within group	34.0%	27.0%	18.0%	21.0%	100.0%
Total					
Count	34	27	18	21	100
% within group	34.0%	27.0%	18.0%	21.0%	100.0%

Table 2. Zinc levels ($\mu\text{g/dL}$) based on gender in the case and control groups

Group	Sex	N	Mean	Std. Deviation	Std. Error Mean
Case	Female	50	96.30	17.53	2.48
	Male	50	74.95	21.83	3.09
Control	Female	50	82.96	15.08	2.13
	Male	50	83.94	16.75	2.37

Table 3. Zinc levels ($\mu\text{g/dL}$) related to acne severity and based on gender

Sex	Grade	Mean	Std. Deviation
Female	Moderate	112.62	21.69
	Severe	91.52	16.09
	Very Severe	92.80	12.12
Male	Moderate	70.61	21.80
	Severe	69.03	20.10
	Very Severe	83.20	21.60

zinc level, acne grading, and duration ($P > 0.05$). In women with acne, the zinc level was inversely correlated with severity of acne ($P = 0.003$) (Table 3).

DISCUSSION

Acne is a common dermatological disease worldwide especially in adolescents. Determination of related factors would lead to better programming for reduction of acne burden. We found that zinc level is not related to acne presentation or its severity, but men with acne had lower levels of zinc, and zinc level in women was related to acne severity.

Ozuguz *et al.* reported that among 150 patients with and without acne, the zinc level was lower in the acne group especially in more severe cases¹⁶. However, in our study, the zinc level was not related to the acne and disease severity; but in women with acne, we found similar results regarding the zinc level and severity.

Kaymak *et al.* reported that serum zinc level was low in 54% and 10% of acne and control groups, respectively, which is in contrast to our findings¹⁷.

El-Saaie *et al.* similarly reported no difference between zinc levels in acne patients and control group¹⁸.

Amer *et al.* reported that serum zinc level was lower in acne patients versus control group, especially in severe acne cases, which is not also in line with the findings of the current study, except for the correlation of zinc level and acne severity in females¹⁹. Moreover, Michaëlsson *et al.* conversely reported that zinc level was lower in acne cases; they assessed a larger sample size, over 170 patients²⁰.

Because of high prevalence of acne, it sounds good to focus on probable related factors for better management or prevention of acne vulgaris, and there are many articles in this regard²².

Since acne is one of the most common skin problems, research on its associations²², novel therapeutic options and related-consequences, is really of great value. So in this case-control study we focused on zinc level as one of the controversial previously proposed associated factors with acne incidence and severity.

CONCLUSION

It may be concluded that zinc level is not different between acne patients and healthy controls and also is not related to acne severity. It can be supposed that zinc supplementation is possibly a good trend in men with acne or to alleviate the severity of acne in women, which needs more evaluation and work up. Further studies with larger sample size are required to attain more definite results, especially with consideration of confounding factors.

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Conflict of Interest: None declared.

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