

Original Article

Does zinc have a role in alopecia areata? A clinic-biochemical study

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ABSTRACT

Objectives: (1) The objectives of the study are as follows: To study serum zinc levels in patients with alopecia areata. (2) To study the correlation between serum zinc levels and severity of alopecia areata.

Material and Methods: A hospital-based and cross-sectional study was conducted in our out-patient Department of Dermatology and STD. All new cases of alopecia areata were included in this study. The patients with clinical features of Systemic Lupus Erythematosus and other autoimmune disorders were excluded from the study. After obtaining a detailed history and examination and confirmation by hair pull test and dermoscopy, the severity of alopecia was graded by Severity of Alopecia Tool score and gauging score. Serum zinc levels of the patients were then measured by calorimetric method.

Results: A total of 88 cases who met the criteria were chosen. Majority of patients were between 20 and 40 years of age with a male preponderance. Patchy pattern of alopecia was the most common pattern noted with scalp being the most commonly involved site. Serum zinc was deficient in around 52.2% of cases. Most of the patients had mild alopecia areata. No significant association was noted between serum zinc levels and alopecia areata. Furthermore, there was no correlation between the severity of alopecia areata and serum zinc levels.

Conclusion: In our study, no association was noted between serum zinc levels and alopecia areata. Furthermore, the severity of alopecia areata did not correlate with serum zinc levels.

Keywords: Zinc, Alopecia areata, Alopecia, SALT score, Gauging score

INTRODUCTION

Alopecia areata is a common recurrent non-cicatricial hair loss which can occur at any hair bearing area. The etiology is often multifactorial (immunological, hereditary, environmental, infection, and endocrine disorders), but the exact etiopathogenesis is not fully understood. Some studies suggest the possible role of trace elements in the pathogenesis of alopecia areata, mainly zinc.^[1] Oral zinc is often used in the treatment of hair disorders like telogen effluvium and alopecia areata even in the absence of zinc deficiency because of its hair growth modulatory properties. In recent studies, around 62% of patients with alopecia areata responded to oral zinc sulfate in a dose of 5 mg/kg/day in three divided doses for a period of 6 months. Furthermore, zinc supplementation could be given as an adjuvant therapy for patients with alopecia areata

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with a low serum zinc level and for whom the traditional therapeutic methods have been unsuccessful.^[2] This study is aimed at finding the correlation between the severity of alopecia areata and serum zinc levels.

MATERIALS AND METHODS

It is a hospital-based and cross-sectional study. All new patients with Alopecia areata attending dermatology clinic on outpatient basis in Sri Manakula Vinayagar Medical College and Hospital from November 2015 to May 2017 were included in the study after getting informed consent. We excluded patients who were already on treatment for alopecia areata, alcoholics, febrile patients, pregnant women, children <5 years, and those who had chronic gastrointestinal and renal disease.

The severity of alopecia areata was graded based on "Severity of Alopecia Tool score" (SALT score) Price and Gummer, 1989 and serum zinc levels were measured by calorimetric method. The demographic details and the clinical features were recorded in the predesigned proforma. Hair pull test and dermoscopy were done to confirm the diagnosis. Chi-square test was used to find the association between serum zinc levels and severity of alopecia areata.

RESULTS

A total of 88 alopecia areata cases who met the criteria were included in the study. The age of the patients ranged from 17 to 62 years (mean age 33.45 ± 10.50 years). Majority (70%) of the patients were between 20 and 40 years of age. A male preponderance was noted among the population with a ratio of 2:1. On analysis of occupation, majority were manual laborer (27%). Around 89.77% of the study population were non-vegetarians.

The duration of alopecia ranged from as early as 1 day–1 year. Most of the patients reported within 1 week duration and in around 76% of cases, the duration was <2 months. The lesions were progressive in around 58% of patients.

Number of patches ranged from 1 to 9. Around 77.27% of patients had only one patch. The size of the patch was <3 cm in 61% of cases. Hair pull test was positive in around 60% of population.

Patchy type of alopecia areata was the most common pattern encountered which constituted around 91%. The other patterns seen were diffuse, ophiasis, linear type, and alopecia universalis [Table 1].

The most commonly affected sites were occipital, parietal, and beard region. In around 25 cases, alopecia was noted in the non-scalp regions.

Nail changes

Nail changes were seen only in 10% of cases. Findings noted were pitting, trachyonychia, longitudinal melanonychia, onychodystrophy, leukonychia, and loss of cuticle.

Serum zinc

Zinc deficiency was noted in 52.27% of cases. It was within normal limit in around 42.05% of cases.

Scoring

SALT score

SALT scoring was used to evaluate alopecia involving the scalp regions of the body. Based on SALT scoring, 57 had mild and five had moderate severity of alopecia areata. None of them had severe alopecia areata.

Out of 62 patients, 46.77% of patients had mild and 4.84% had moderate alopecia areata.

Gauging score

Gauging score was used for both scalp and non-scalp areas. Based on this scoring, the number of mild, moderate, and severe cases was 57, 30, and 1, respectively.

Chi-square test did not show any significant association between serum zinc levels and alopecia areata based on SALT score and Gauging score [Tables 2 and 3]. No correlation was

Table 1: Patterns of alopecia areata in study population ($n=88$).

Pattern	Frequency	Percent
Patchy	80	90.91
Diffuse	4	4.55
Ophiasis	2	2.27
Linear	1	1.14
Alopecia universalis	1	1.14
Total	88	100.00

Table 2: Association between serum zinc levels and alopecia areata based on SALT score.

Serum zinc levels	Based on SALT score		
	Mild	Moderate	Total
<70	29	3	32
70–180	24	1	25
>180	4	1	5
Total	57	5	62
Chi-square	Probability		
4.2334	0.3753		
SALT score: Severity of alopecia tool score			

found between the severity of alopecia areata and serum zinc levels. The scatter plot showed no correlation between the two [Figures 1 and 2].

DISCUSSION

Zinc is an essential micronutrient and is the second most abundantly distributed trace element in the body next to iron.^[3] Tissues with high cellular turnover such as skin and hair are characteristically affected by zinc deficiency.^[4] Although there have been no large scale studies on the prevalence of zinc deficiency in India, the available evidence suggests that zinc deficiency is uncommon in Indian population. Based on the WHO's RDA, the risk of zinc inadequacy is only marginal among Indian population mainly because of the Indian style of cooking. The serum zinc levels are influenced by the age, diet, and health status. Zinc deficiency is more common with vegetarian diet, as the phytates in the vegetarian diet reduces the intestinal absorption of zinc.^[5]

Zinc deficiency is associated with various dermatological disorders. Oral zinc is often used in the treatment of hair disorders like telogen effluvium and alopecia areata even in the absence of zinc deficiency because of its hair growth modulatory property.^[2]

In our study, the most common age group affected was 20–40 years (70%) which was in concurrence with the

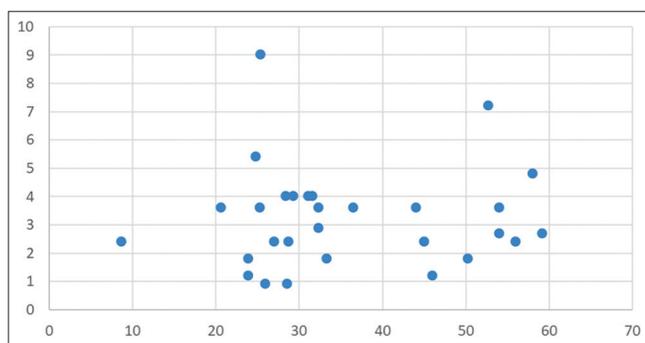


Figure 1: Scatter plot showing no correlation between mild alopecia areata and serum zinc levels.

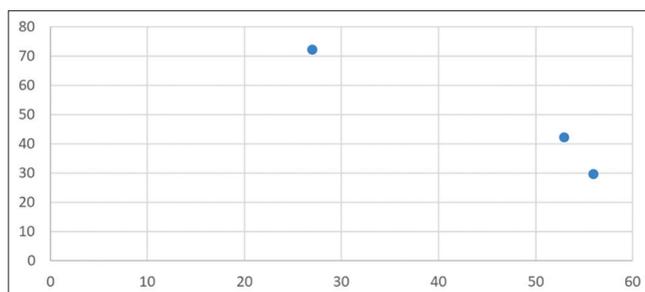


Figure 2: Scatter plot showing no correlation between moderate alopecia areata and serum zinc levels.

study done by Tan *et al.* and Bhat *et al.*^[6,7] The mean age of onset has been reported as between 25.2 and 36.3 years in various studies done in other parts of the world.^[8] Similar to our study, the scalp was found to be the most common site involved, with or without involvement of other body sites.^[6,9]

Table 3: Association between serum zinc levels and alopecia areata based on Gauging score.

Based on Gauging score				
Serum zinc levels	Mild	Moderate	Severe	Total
<70	33	12	1	46
70–180	22	15	0	37
>180	2	3	0	5
Total	57	30	1	88
Chi-square	Probability			
4.1931	0.3805			

Table 4: Studies on zinc in alopecia areata.

Bhat <i>et al.</i> ^[7]	Trace element levels in alopecia areata	Statistically significant low zinc levels in alopecia areata patients, but no significant change was observed in copper and magnesium levels. The decreased levels of zinc was observed more in those patients with prolonged duration, extensive lesions and in lesions resistant to treatment.
Kil <i>et al.</i> ^[13]	Levels of serum zinc and copper levels in patients with hair loss	Zinc deficiency was statistically more in patients with alopecia areata than those with copper deficiency
Dastgheib <i>et al.</i> ^[14]	Serum and hair levels of copper, iron and zinc in patients with alopecia areata	Significant correlation between the levels of zinc, iron and copper in hair and serum
El-Ashmawy and Khedr ^[15]	Trace elements levels in alopecia areata	Statistically significant decrease in serum zinc levels in alopecia areata patients suggesting the irpossible role in the pathogenesis of Alopecia areata
Fattah <i>et al.</i> ^[11]	Serum levels of zinc in alopecia areata and its correlation with disease duration	Lower serum levels of zinc in alopecia areata and is inversely correlated with disease duration, severity of alopecia areata and resistant to therapies

Around 26.2% of patients had occipital involvement which was in concordance with another study where the occipital involvement was 38.4% for males and 33.4% for females.^[10] Majority of the patients had a single patch which was similar to the observations made by Fattah *et al.* and Bhat *et al.* in their studies.^[7,9] Majority of our patients were non-vegetarians and the levels of zinc did not correlate with diet.

Although majority of the patients had reduced serum zinc levels, there was no statistically significant difference in the occurrence of alopecia areata in those with zinc deficiency and those without. This was in concordance with the study done by Mussalo-Rauhamaa *et al.* where they found no difference in zinc levels in patients with alopecia areata when compared to normal controls.^[11,12] Further Fattah *et al.* in his study observed an inverse correlation between serum zinc levels and duration and severity of alopecia areata.^[11]

Studies done by Kil *et al.*, Dastgheib L and El-Ashmawy showed that serum zinc deficiency was statistically more in patients with alopecia areata.^[13-15] The results of these studies on zinc in alopecia areata are summarized in [Table 4].

The main limitation of this study was that it was not a case controlled study and the patients were not followed up.

CONCLUSION

Zinc is an important nutrient required for hair growth as evidenced by various studies. The role of zinc in alopecia areata is not significant and probably other factors such as immunity and genetics have an important role to play. However in studies which showed improvement in alopecia areata after intake of zinc, the zinc was probably acting as a nutrient supplement rather than its role in pathogenesis.

Declaration of patient consent

Patient's consent not required as patient's identity is not disclosed or compromised.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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