Journal of Pakistan Association of Dermatologists. 2023;**33(4)**:1442-1445.

Original Article

Frequency of serum zinc deficiency in diagnosed patients with melasma

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Abstract

Objective Melasma is a commonly acquired hyperpigmentation of sun exposed areas of skin especially on face. Zinc is a trace element that is essential for numerous enzymatic processes. The objective of the study is to find serum zinc deficiency in diagnosed patients of melasma.

Methods This cross sectional study was carried out at department of dermatology, Mayo hospital Lahore from July 7, 2018 till Jan 7, 2019. A total of 150 diagnosed cases of melasma were included. Samples of venous blood were taken and analysed for serum zinc levels. Zinc level was labeled low if it was below cut off value of 100ug /dL.

Results Of 150 cases, 118 (78.7%) were females and 32(21.3%) were males, with mean age of patients being 29.77±5.96 years. A total of 67 (44.7%) cases had epidermal, 61 (40.7%) had dermal and 22 (14.7%) had mixed type of melasma. A total of 53 (35.3%) cases had mild, 64 (42.7%) cases had moderate and 33 (22%) cases had severe melasma. Zinc deficiency was found in 65 (43.3%) cases while 85 (56.7%) cases had normal zinc levels.

Conclusion Zinc supplementation can be recommended in conventional treatment of melasma to obtain maximum outcome.

Key words
Melasma; Serum zinc level; Zinc deficiency.

Introduction

The word melasma derives from a Greek word melas that means black. Melasma is a relatively common, acquired facial pigmentation with a characteristic pattern of symmetrical, marginated, light-to-dark brown hyperpigmented macules and patches, involving sun-exposed sites particularly on face and occasionally affecting the forearms.[1] Melasma has three distinct types: epidermal, dermal and mixed type. Epidermal is the commonest type. Melasma affects women more than men.[2]

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Zinc is an essential trace element important for numerous structural proteins, enzymatic processes and transcription factors. It is an essential part of more than 300 metallo-enzymes and over 2000 transcription factors required for regulation of lipids, protein and nucleic acid metabolism. It also plays important roles in the cell-mediated immunity, bone formation, brain function, fetal development and growth of children. It is also involved in pathogenesis of some dermatological disorders.[3]

Low serum zinc levels have been found in different dermatological conditions including, vitiligo, alopecia areata, warts, leprosy, cutaneous leishmaniasis, psoriasis, acne vulgaris hidradenitis suppurativa, rosacea, aphthous ulcers and Behcet's disease. It has been observed that in many of skin disorders

associated with low serum zinc levels, oral zinc supplementation results in improved symptoms[4]. A study designed to evaluate the levels of serum zinc in patients with melasma reported that zinc deficiency was found in 45.8% cases of melasma.[4]

The rationale of this study is to find serum zinc deficiency in diagnosed patients of melasma in local population. So far, no studies have been conducted on local population and studies on other populations are also limited. Through this study if we find higher serum zinc deficiency in melasma cases in local population then zinc supplementation can be recommended in conventional treatment of melasma.

Methods

This was a cross sectional study carried out at Department of Dermatology, Mayo hospital Lahore and was completed in 6 months (July 7, 2018 till Jan 7, 2018). By non-probability consecutive sampling, 150 diagnosed melasma patients of either gender with age between 20-40 years were enrolled. All cases were enrolled after taking informed consent from ethical committee of Mayo hospital.

Exclusion criteria was defined as cases taking any treatment with zinc in 1 month preceding the diagnosis, or any treatment with inhaled or topical steroid or systemic steroid within one month prior to study. Patient with history of chronic diarrhoea, liver or renal disease or history of alcoholism were also excluded from the study. Pregnant females were also not included. Type of melasma as epidermal, dermal or mixed was determined by wood's lamp examination.

After collecting all demographical information like age, gender, marital status and contact details of the patients, blood samples were collected from veins of patients under aseptic measures and were sent to hospital laboratory for analysis of serum zinc. Serum zinc level was labelled low if below the cut off value of 100ug/dl in the serum. All data was collected on proforma by researcher herself.

Data was analysed using SPSS version 20. Mean±S.D was used for quantitative variables like age, serum zinc level, weight, height and BMI. Frequency (%) was used for qualitative data such as gender and deficiency of serum zinc. To address effect modifiers, data stratification was done for age, BMI, gender, type and severity of melasma. After stratification, Chi-square test was used and p-value ≤ 0.05 was taken as significant.

Results

The mean age of patients was 29.77±5.96 years with range of 20-40 years. There were 32 (21.3%) cases 20-29 years old and 83 (55.3%) cases were 30-40 years old. There were 32 (21.3%) males and 118 (78.7%) females with 1:3.68 male to female ratio. There were 105 (70%) non-obese and 45 (30%) obese cases.

A total of 67 (44.7%) cases had epidermal, 61 (40.7%) cases had dermal and 22 (14.7%) cases had mixed.

A total of 53 (35.3%) cases had mild, 64 (42.7%) cases had moderate and 33 (22%) cases had severe melasma.

The mean serum Zinc level was 82.92±26.16 with minimum and maximum serum Zinc levels as 50.40 and 134.90 respectively **(Table 1)**.

A total of 65(43.3%) cases had serum zinc deficiency and 85(56.7%) cases had normal Zinc levels **(Figure 1)**.

When data stratification was done for gender, age, BMI, types and severity of melasma, the

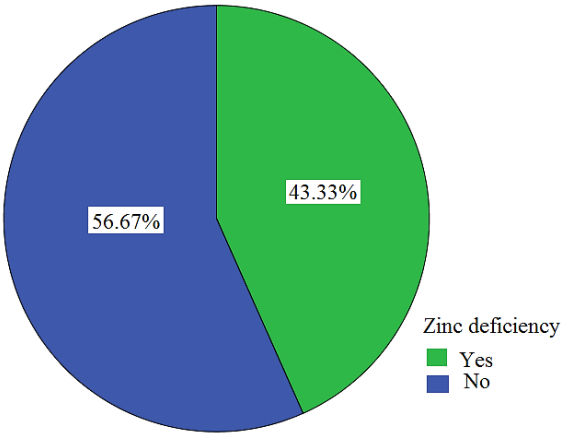

Figure 1 Distribution of serum zinc deficiency.

Table 1 Descriptive statistics of Serum Zinc levels.

Mean	82.92
S.D	26.16
Minimum	50.40
Maximum	134.90

frequency of Zinc deficiency was found statistically same with respect to these effect modifiers (p value >0.05).

Discussion

Melasma is an acquired condition of skin in which the sun exposed parts of skin get pigmented. It has 3 major types: epidermal, dermal or mixed. In our study the commonest presenting type was epidermal with 44.7% cases while a similar study from India showed dermal type to be common with incidence ratio of 54.48% while the epidermal type had 21.47% incidence. The difference is probably due to different geographical distribution and cultural practices. It commonly affects women more than men. We had the gender (male to female) ratio of 1:3.68 which was consistent with Indian study and other similar studies.[5] True prevalence of melasma is unknown. It varies in different population and incidence as high as 40% has been reported in south east population.[6] Almost 90 percent of patients having melasma had skin type III and IV according to a study.[6]

The precise etiology of melasma is unknown but various factors have been involved in the pathogenesis of melasma, including sunlight exposure, genetic background, hormonal problems, pregnancy, oral contraceptive drugs, cosmetics, thyroid abnormalities and deficiency of antioxidants like zinc. The frequency of zinc deficiency in our study in melasma affected was 43.3% while a similar study has shown this frequency to be 45.8% which is nearly the same. The mean serum level of zinc was 77.4±23.2ug/dl in patients which is slightly lower than our study i.e. 82.92±26.16.[4] A review article by Wu MX *et al.* has also cited the correlation between zinc deficiency and melasma suggesting zinc supplementation as possible preventive strategy for melasma.[8] Based upon similar findings, another review article has suggested topical zinc as possible therapeutic agent for treatment of melasma though results from various studies in this regard are conflicting.[9] Correlation of zinc deficiency has been studied with thyroid disorders. This correlation was not found to be staticallysignificant.[10] No significant correlation was found between BMI and zinc deficiency in our study too.

Conclusion

Zinc deficiency may be a contributing cause for melasma in our population and oral or topical zinc supplementation should be considered while treating melasma patients.

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