



## Assessment of serum iron profile at different depths of pigmentation in female patients of Melasma

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### ABSTRACT

Melasma is an acquired chronic condition of the skin caused due to disturbance in the process of melanin synthesis, which then results in localized hyperpigmentation of skin. Examination with help of Wood's lamp helps in the assessment of depth of hyperpigmentation due to melanin and classify it as epidermal, dermal or mixed. In this study, we assess the levels of serum iron, serum ferritin and TIBC at different depths of pigmentation in female patients of melasma. The depth of pigmentation was determined by dermatoscopic examination and classified into epidermal, dermal and mixed types in 50 cases of melasma in females more than 18 years of age. Serum iron, serum ferritin and TIBC levels were measured in all. Frequency of epidermal, dermal and mixed melasma was observed in 10 (20%), 12 (24%) and 28 (56%) cases respectively. Although serum iron and serum ferritin level was lowest in case of dermal melasma (94.52mcg/dl and 87.17 ng/ml, SD 50.65 and 72.41 respectively) followed by mixed (102.50mcg/dl and 95.36ng/ml, SD 48.66 and 64.96) and epidermal melasma (122.48mcg/dl and 108.86ng/ml, SD 28.16 and 40.54 respectively), however these differences were found to be statistically insignificant. A slightly higher TIBC level was found in case of dermal melasma (422.25mcg/dl, SD 113.22) as compared to mixed (389.89mcg/dl, SD 115.77) and epidermal melasma (339.20mcg/dl, SD 73.50) but the difference was found to be statistically insignificant. In melasma patients, it was seen that derangement of serum iron profile was directly proportional to the depth of hyperpigmentation implying that more derangement of iron profile was seen deeper pigmentation whereas less derangement of iron profile was seen in superficial pigmentation.

**Key words:** Melasma, Dermal melasma, Epidermal melasma, Mixed melasma, Iron profile

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### INTRODUCTION

Melasma is an acquired condition of the skin mostly occurring in the age group of 20-40 years due to melanogenesis dysfunction, resulting in localized hypermelanosis. It is most commonly manifested as hyperpigmented macules and patches over face that present bilaterally. They become more prominent due to sun damage.[1,2]

Wood's lamp examination can be helpful to identify the depth of melanin pigmentation and determine the type of melasma (epidermal, dermal or mixed). According to recent studies, the deposition of melanin pigment in dermis is not evaluated properly by Wood's lamp.[3] Dermatoscopy is superior to Wood's lamp as it not affected by patient's skin colour and collagen as well as vascular changes can also be appreciated.

Epidermal melasma shows a network of homogenous brownish pigmentation not involving hair follicles and sweat glands, producing a pseudonetwork like pattern with concavity in the borders also known as the "jelly sign".[4]

Dermal melanomas have an uneven pigment network and greyish brown or greyish black pigmentation. It responds less to traditional treatments. Epidermal and dermal characteristics can be seen in mixed melasma. Dermatoscopy reveals irregular brownish or greyish black spots of widespread reticular pigmentation (features of both epidermal and dermal types).

Classification of type of melasma is important in order to choose a line of treatment and also to help the patient understand the prognosis since dermal melasma responds less to treatment, especially to topicals.[5]

There is a paucity of studies assessing serum iron profile at different depths of pigmentation in melasma. Hence, we decided to undertake this study.

## MATERIAL AND METHODS

An observation study was carried out in the OPD of dermatology department in a tertiary care hospital, from December 2019 to July 2021 in 50 females (> 18 years of age) with clinically diagnosed melasma. Exclusion criteria included pregnant women having melasma and patients with other co-morbidities like cardiac disease, renal, haematological and hepatic diseases.

The institutional ethics committee approved the study. Written informed consent was taken. The patients' medical history, demographic profile, and physical examination were all thoroughly documented. The depth of pigmentation was determined by dermatoscopic examination and classified into epidermal, dermal and mixed types. Serum iron, serum ferritin and TIBC levels were measured using fully automated EM 200 chemical analyser, Microplate Chemiluminescence Immunoassay (CLIA) and fully automated EM 200 chemical analyser respectively.

Serum iron level of 50-175 µg/dL, serum ferritin level of 12- 150 ng/dL and TIBC level of 250-450 µg/dL was considered as normal level in the present study.

All the data was recorded in Microsoft excel sheet. Assessment of levels of serum iron, serum ferritin and TIBC were done at different depths of melasma. The results were subjected to statistical analysis.

## RESULTS

The distribution of cases into epiderma, dermal and mixed type of melasma is as shown in Figure 1.

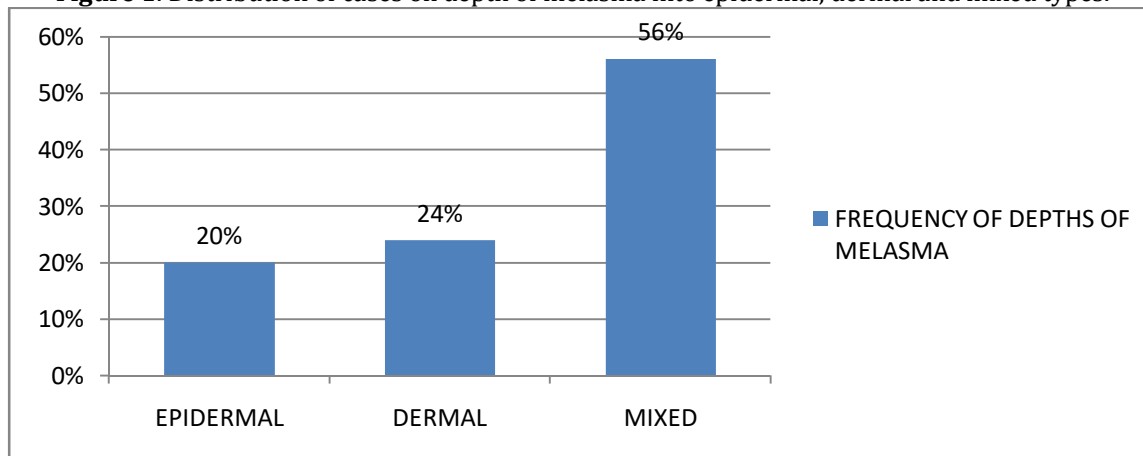
Mean levels of serum iron, serum ferritin and TIBC in cases of epidermal, dermal and mixed types of melasma are as shown in Table 1, 2 and 3 respectively.

It was observed that although serum iron level was higher (122.48 mcg/dl) in epidermal melasma compared to in mixed melasma (102.5 mcg/dl) and lowest in dermal melasma (94.52 mcg/dl), but these differences were found to be statistically insignificant ( $p > 0.05$ ).

Similarly higher serum ferritin levels were seen in epidermal melasma (108.86 ng/ml) as compared to mixed (95.36 ng/ml) and dermal melasma (87.17 ng/ml), but all these differences were also found to be statistically insignificant ( $p > 0.05$ ).

A slightly higher TIBC level was found at dermal melasma (422.25 mcg/dl) as compared to mixed (389.89 mcg/dl) and epidermal melasma (339.20 mcg/dl) but the difference was again found to be statistically insignificant ( $p > 0.05$ ).

**Figure 1:** Distribution of cases on depth of melasma into epidermal, dermal and mixed types.



**Table 1:** Comparison of serum iron in cases of epidermal, dermal and mixed type cases of melasma.

S. No.	Type of melasma	Number	Mean (mcg/dl)	Standard Deviation	T value	P value
1.	Epidermal	10	122.48	28.16		
2.	Dermal	12	94.52	50.65	0.957	0.391
3.	Mixed	28	102.50	53.09		
4.	Total	50	104.58	48.66		

**Table 2:** Comparison of serum ferritin cases of epidermal, dermal and mixed type cases of melasma.

Serial No.	Type of melasma	Number	Mean (ng/ml)	Standard Deviation	T value	P value
1.	Epidermal	10	108.86	40.54		
2.	Dermal	12	87.17	72.41	0.299	0.743
3.	Mixed	28	95.36	69.84		
4.	Total	50	96.09	64.96		

**Table 3:** Comparison of TIBC in cases of epidermal, dermal and mixed type cases of melasma.

S. No	Type of melasma	Number	Mean (mcg/dl)	Standard Deviation	T value	P value
1.	Epidermal	10	339.20	73.50		
2.	Dermal	12	422.25	113.22	1.618	0.209
3.	Mixed	28	389.89	115.77		
4.	Total	50	387.52	109.68		

## DISCUSSION

The skin condition known as melasma is characterised by persistent discoloration and is thought to originate from a malfunction in melanogenesis, which leads to hyperpigmentation in specific areas. Very few studies are available comparing the serum iron profile with severity of melasma,

Qazi et al<sup>[6]</sup> in 2017 conducted a cross-sectional case control study to evaluate the total body iron stores by assessing serum iron, serum ferritin and total iron binding capacity (TIBC) levels amongst 70 non pregnant females with and without melasma. The severity of melasma was assessed on the basis of MASI score. Results showed a negative correlation between serum iron levels and serum ferritin levels with severity of melasma as per the MASI score. However, severity of melasma as measured by the MASI score and TIBC levels were found to be positively correlated.

Goodarzi et al<sup>[7]</sup> in the year 2020 did a study to assess the serum iron profile in melasma patients. This study compared 51 melasma patients to 51 controls in non pregnant females. Melasma was diagnosed clinically and severity index (MASI) score was calculated. No statistically significant correlation was found between serum iron profile parameters and MASI score.

No studies are available that correlate the depth of pigmentation in melasma with serum iron profile as has been done in our study.

Although this study has been able to demonstrate that mean values of serum iron and serum ferritin are lower and TIBC levels on the other hand comparatively higher in case the pigmentation in skin is dermal as compared to when it is only epidermal, statistical significance has not been established. This may be due lesser number of cases studied. This study may be treated as a pilot study and studies with larger sample size may be planned in future to look for significance of iron profile when compared with depth of melasma pigmentation.

## CONCLUSION

The results of our study show that patients with deeper pigmentation in melasma showed severe derangement of serum iron profile in comparison to patients with superficial pigmentation.

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