International Journal Dental and Medical Sciences Research
Volume 2, Issue 2, pp: 43-50 www.ijdmsrjournal.com ISSN: 2582-6018

# A Study of Epidemiological and Clinicopathological Correlation of Facial Hyperpigmentation in Females

Swati Gupta M.D Dvl, Tarang Goyal M.D Dvl
*Muzaffarnagar Medical College*
*Muzaffarnagar Medical College*
*Corresponding author: Swati Gupta M.D Dvl*

Date of Submission: 30-07-2020 Date of Acceptance: 07-08-2020

**ABSTRACT:** Introduction: Pigmentary disorders comprise almost one third of the dermatological consultations. The incidence, frequency and severity of pigmentary disorders vary across different geographic regions. They are particularly worse in warmer areas and in conditions where skin becomes more exposed. The pattern of reporting hyperpigmentation is age dependent, with most common complaint amongst those aged 40 to 54 years and second most in age group 15 to 30 years. Material and method: A total number of 150 female patients above 18yr of age with facial hyperpigmentation attending dermatology outpatient department of Muzaffarnagar medical college, Muzaffarnagar, U.P during 2017-2018. Woods lamp examination was conducted to determine the type of Melasma (Epidermal, Dermal or Mixed) clinically. Skin biopsy was performed to all patients at the first visit and histopathological results were compared with the clinical diagnosis. With informed consent, 3-4mm elliptical biopsy from the lesional skin of patient was taken and tissue was prepared for light microscopic examination by fixation in 10% formalin and stained with Hematoxylin& Eosin. Further, the section was preceded for special staining i.e., Masson Fontana, Congo red, KOH/PAS to categorize histopathologically and were correlated with the clinical entity. Result: On the basis of clinicodemographic profile, melasma is the most common diagnosis (52%) followed by Reihl's melanosis (21.3%), ochronosis (10%), TSDF (6.6%),ashy dermatosis (3.3%), PDL (2%), Argyria, amyloidosis and DLE (1.3% each) and Poikiloderma of civatte (0. 6%).Histopathologically, a total of nine entities were identified as: melasma (80 patients; 53.3%) followed by Reihl's melanosis (40 patients; 26.6%), PIH (12 patients; 8%), ochronosis (6 patients; 4%), TSDF (5 patients; 3.3%), Ashy dermatosis and DLE (3 patients each; 2% each) and colloid milium (1 patient; 0.6%).Appropriate statistics were applied and results indicated the concordance of the clinical assessment. Conclusion: An agreement of 65% was observed between histopathological findings and clinical diagnosis with respect to various presentations of facial pigmentation.

**KEYWORDS:** Pigmentary disorders, hyperpig mentation, melasma, ochronosis, TSDF

## I. INTRODUCTION

Variability in pigmentation is well-established, with some skin tones, especially in Asian and Indian subjects, reported to be more susceptible to pigmentation disorders than other human groups [1],[2].Pigmentary disorders comprise almost one third of the dermatologicalconsultations. The incidence, frequency and severity of pigmentary disorders varyacross different geographic regions. They are particularly worse in warmer areas andin conditions where skin becomes more exposed. The pattern of reportinghyperpigmentation is most common complaint amongst thoseaged 15 to 54, regardless of skin colour and gender.[3]Hyperpigmentation can be caused by a variety of diseases which may becongenital, with different patterns of inheritance, or acquired forms secondary tocutaneous (cosmetics, perfumes, sun exposure) or systemic problems (mainlyhormonal) and often represent paramount causes of emotional distress. The vastmajority of them are linked to alterations in the melanin pigment and may be classified as epidermal and dermal hyperpigmentation, depending on the location of the pigments. Epidermalhyperpigmentation is because of melanin pigmentation. Dermal pigmentation is mayeither be due to melanin or due to non-melanin pigments. Hyperpigmentation's are a group of diseases that comprise both congenitalforms, with different patterns of inheritance, and acquired forms secondary

International Journal Dental and Medical Sciences Research
Volume 2, Issue 2, pp: 43-50 www.ijdmsrjournal.com ISSN: 2582-6018

tocutaneous or systemic problems. Pigmentary disorders are a frequent source of complaints, constituting thethird most common reason for dermatological consultations, about 8.5% in ourcountry. There is a different impact depending on the geographic region, being worsein places where the weather is always warm, and the skin becomes more exposed.This review will focus on the main acquired hyperpigmentation disordersassociated with increased melanin, taking into account those most commonly found inclinical practice. Melasma most common in people with light brown skins, especially in people who live in areas with intense solar ultraviolet radiation (UVR)[4] .Most FM are commoner in darker races with both light and photosensitizingchemicals (occupational/ in cosmetics) playing an important role. Based on thelocation of melanin (as identified by color of lesion, accentuation of color underWood's light and histopathology, though the correlation between Wood's lampfindings and histopathology is less than satisfactory) three types of hypermelanosisare identified:

The most common dermatological causes of acquired hyperpigmentation can be described as: [5]

1. Erythema dyschromicum perstans
2. Lichen planus pigmentosus
3. Amyloid melanosis
4. Melasma (cholasma)
5. Riehl‘s melanosis
6. Idiopathic eruptive pigmentation
7. Post-inflammatory hyperpigmentation, and
8. Hyperpigmentation due to drugs and heavy metals.

| S.NO | ENTITY | HISTOPATHOLOGIGAL DIAGNOSIS |
|---|---|---|
| 1 | Acanthosis nigricans | Hyperpigmentation of basal and suprabasallayers, hyperkeratosis and papillomatosis. |
| 2 | Exogenous Onchronosis | Brown pigment deposits in shape of a ‘banana‘are found lying freely in dermis in between collagen bundles. |
| 3 | Lichen planus pigmentosus | Vacuolar interface dermatitis with a scarce lymphohistiocytic infiltrate, fibroplasia and pigmentary incontinence in papillary dermis. |
| 4 | Erythema dyschromicum perstans | Lichenoid infiltrate without fibroplasias |
| 5 | Riehl‘s melanosis | Basal cell degeneration and perivascular lymphocytic infiltrate in dermis |
| 6 | Poikiloderma of Civatte | Coarse collagen in the upper dermis, perivascular infiltrate of lymphocytes, histiocytes and few neutrophils. |
| 7 | Becker‘s melanosis | Increase melanin deposition in basal layer, acanthosis with squat rete ridges,papillomatosis and thickening of dermis. |
| 8 | Café au lait macules | Pigmentation of basal layer |
| 9 | Macular amyloidosis | Amyloid deposits in dermal papillae close to dermoepidermal junction. |
| 10 | Frictional melanosis | Mild hyperkeratosis, acanthosis, hyperpigmentation in basal layer. |
| 11 | Pigmentary demarcation lines | Non-specific increase pigmentation in basal layer. No evidence of interface dermatitis or amyloid deposition |

International Journal Dental and Medical Sciences Research
Volume 2, Issue 2, pp: 43-50 www.ijdmsrjournal.com ISSN: 2582-6018

| | | |
|---|---|---|
| 12 | Post inflammatory hyperpigmentation | A basket-weave horn Papillary dermis thickened by fibrosis A sparse superficial perivascular lymphohistiocytic infiltrate Many melanophages in the papillary dermis |
| 13 | Nevi of Ota and Ito extending deep into the subcutis | Prominent sebaceous lobules of the facial skin Many slender dendritic pigmented melanocytes arranged horizontally between collagen bundles in the mid dermis Few or no Melanophages Melanocytic proliferation |
| 14 | Lupus erythematosus | Epidermis-hyperkeratosis, atrophy, interface dermatitis, thickening of basement membrane. Dermal-dense mononuclear cell infiltrate mainly lymphocytes and macrophages. |
| 15 | Lentigo simplex | A basket-weave cornified layer Slender elongated rete ridges. Melanophages within the papillary dermis |
| 16 | Berloque dermatitis | Increased epidermal melanin and Melanophages in the superficial dermis |
| 17 | Melasma | Increased epidermal hyperpigmentation Increased number of melanocytes Increased activity of melanogenic enzymes |

## II. MATERIAL AND METHODS

A total number of 150 female patients>18 years of age were taken under the study presenting with facial hypermelanosis attending outpatient department in the department of Dermatology, Venereology and Leprology at Muzaffarnagar medical college and hospital at a period of 18months.A written consent was obtained from all patients after all details were explained to the patients. These include the duration of study, approval for skin biopsy, application and stoppage of any kind of treatment prior study. The study was preceded after taking approval from Institutional Ethical Committee. A full detailed history was obtained including the onset, patient age at beginning of pigmentation, duration, progression, associated symptoms, family history, residency, occupation and full physical examination including morphology, distribution and configuration.

All skin biopsies of hyperpigmented lesion sent to the Department of Pathology, Muzaffarnagar Medical College, Muzaffarnagar, U.P

**COLLECTION OF DATA**

1. Onset
2. Duration
3. Progression
4. Area involved
5. Hours of sun exposure
6. Occupation
7. History of photosensitivity
8. Other medication (oral/systemic)
9. Topical medication (hair dye, fragrances, mustard oil, exposure to chemicals)
10. Family history
11. Pregnancy and lactation
12. Onset during pregnancy
13. History of use of oral contraceptives
14. Obstetrical history
15. History of acne, hirsutism, polycystic ovarian disease

The following parameters would be taken into consideration.

**INCLUSION CRITERIA**

Patient above 18 years of age
Patient with aesthetic purpose.
Patient with realistic expectation.

International Journal Dental and Medical Sciences Research
Volume 2, Issue 2, pp: 43-50 www.ijdmsrjournal.com ISSN: 2582-6018

**EXCLUSION CRITERIA**

Patient with active herpes, chicken pox, viral exanthem infection.
Patient not willing for procedure.
Patient with keloidal tendency.
Patients with deranged clotting profile
Pregnancy
Lactation

**INVESTIGATIONS: (when required)**

Complete blood profile
Blood sugar
Lipid profile
Liver function test
Hormonal profile (LH, FSH values, testosterone, Serum DHEAS, serum cortisol)
Ultrasound abdomen to rule out polycystic ovarian disease
VitaminB12
Thyroid hormones (T3, T4, TSH, Parathyroid hormone)

**VISUAL ASSESSMENT**

In both research and clinical settings, it is important to be able to accurately assess a subject‘s normal skin color or hue and their baseline degree of pigmentation so that any subsequent changes following treatment can be quantified.

**PHOTOGRAPHY**

All patients will be photographed and documented as per same position, angle of face exposure on day1 of attending OPD. Minimum 3 photographs will be taken, one front view and 2 lateral view will be taken with appropriate numbering.

**WOOD’S LAMP EXAMINATION**

Wood's lamp was invented in 1903 by Robert W. Wood.It emits long-wave UV radiation (UVR)generated by Wood's filter which is opaque except to a band between 320 - 400 nm with peak at 365 nm.

**Technique of Wood's lamp examination**

The lamp was to be allowed to warm up for about 1 minute. The examination room was perfectly dark, with black occlusive shades.The light source was4 to 5 inches from the lesion. The area was not washed before subjecting it for Wood's lamp examination since it may yield false negative results due to dilution of the pigment. Topical medicaments, lint and soap residues was wiped off from the site to be examined since these may fluoresce under Wood's light.

**Hyperpigmentary dermatoses**

Wood's lamp was used to determine the depth of melanin in the skin, asvariations in epidermal pigmentation become more apparent under Wood's light. For dermal pigmentation, the contrast is less pronounced. Based on Wood's light findings, melasma is classified into four subtypes: epidermal, dermal, mixed and Wood's light inapparent. Woods lamp examination was conducted to determine the type of Melasma (Epidermal, Dermal or Mixed). Examination of patients with Wood's light was useful in classifying the specific type of melasma in correlation with the localization of melanosomes in epidermis and dermis.

**BIOPSY**

Skin biopsy was performed to all patients at the first visit and histopathological results were compared with the clinical diagnosis. With informed consent, 3-4mm elliptical biopsy from the lesional skin of patient was taken and tissue was prepared for light microscopic examination by fixation in 10% formalin and stained with Hematoxylin& Eosin. Further, the section was preceded for special staining i.e., Masson Fontana, Congo red, KOH/PAS to categorize histopathologically and were correlated with the clinical entity. A skin biopsy is a simple procedure of great diagnostic importance and serves as permanent record of the skin pathology. In our study we considered excisional surgical biopsy method.

**Steps**

1. Consent and preparation
2. After taking the patient‘s consent, the biopsy area was cleaned with an antiseptic, prior trimming ofthe hair may be necessary if the region is hairy.
3. Local Anesthesia.
4. Use of 2% lignocaine with 1:1000 adrenaline is advisable for vascular area that are not supplied byterminal arteries.
5. Excisional elliptical biopsy 3-4mm skin were taken from involved area and entire lesion were removed, followed by suturing of the defect. Biopsy sent in 10% buffered formalin. Serial section were taken and stained with Hematoxylin& Eosin stain in all subjects.

**Special stains were used wherever necessary which included:** Masson Fontana, Congo red and KOH/PAS (Periodic acid Schiff)

## III. OBSERVATIONS AND RESULTS

The study was done to analyze the association between clinical features of facial hyperpigmented

International Journal Dental and Medical Sciences Research
Volume 2, Issue 2, pp: 43-50 www.ijdmsrjournal.com ISSN: 2582-6018

lesions and correlate with histopathological diagnosis in adult Indian females. For this purpose a total of 150 female patients between the ages of 18-55years were taken in sampling frame and enrolled after taking proper consent in the study. All the patients underwent a thorough demographic evaluation, exposure to risk factors, clinical history and examination followed by a histopathological evaluation.

**TABLE 1: AGE OF PRESENTATION**

| AGE (in years) | No. OF PATIENTS | PERCENTAGE (%) |
|---|---|---|
| <20 | 5 | 3.3 |
| 21-30 | 64 | 42.6 |
| 31-40 | 70 | 46.6 |
| 41-50 | 8 | 5.3 |
| >50 | 3 | 2 |
| Mean Age±SD (Range) in years | 31.82 ± 6.81 | |

**TABLE 2: LOCATION OF PIGMENTATION**

| | | |
|---|---|---|
| Malar, cheek, nose, mandible, forehead | 85 | 56.6 |
| Between malar and temporal area | 37 | 24.6 |
| Lateral side of face | 22 | 14.6 |
| Angle of mouth to lateral side of chin | 6 | 4 |

**TABLE 3: COLOUR OF PIGMENTATION**

| COLOUR OF PIGMENTATION | NO. OF PATIENTS | PERCENTAGE (%) |
|---|---|---|
| Bluish grey | 6 | 4 |
| Brown | 35 | 23.3 |
| Dark brown | 77 | 51.3 |
| Grey brown | 16 | 10.6 |
| Light brown | 12 | 8 |
| Slate grey | 4 | 2.6 |

**TABLE 4: DEPTH OF PIGMENTATION ON WOODS LAMP**

| DEPTH OF PIGMENTATION ON WOODS LAMP IN MELASMA | NO. OF PATIENTS (OUT OF 78 PATIENTS) | PERCENTAGE (%) |
|---|---|---|
| Dermal | 17 | 21.7 |
| Epidermal | 17 | 21.7 |
| Mixed | 44 | 56.4 |

**TABLE 5: EXPOSURE TO RISK FACTORS**

| EXPOSURE TO RISK FACTORS | NO. OF PATIENTS | PERCENTAGE (%) |
|---|---|---|
| Daily sun exposure<br>< 2 hours<br>3-8 hours<br>>8 hours | <br>54<br>66<br>30 | <br>36<br>44<br>20 |
| Duration of onset | | |

International Journal Dental and Medical Sciences Research
Volume 2, Issue 2, pp: 43-50 www.ijdmsrjournal.com ISSN: 2582-6018

| | | |
|---|---|---|
| < 1 month<br>2-3 months<br>4-6 months<br>7-12 months<br>>12 months | 17<br>25<br>30<br>35<br>43 | 11.3<br>16.6<br>20.0<br>23.3 |
| History of Photosensitivity | 85 | 56.6 |
| History of Systemic drugs | 36 | 24 |
| History of Topical drugs | 127 | 84.6 |
| Onset during pregnancy | 7 | 4.6 |

**TABLE 6: MOST COMMON OBSERVATIONS IN OUR STUDY**

| **Most common observations in our study** | **Percentage of patients out of 100% (n=150)** |
|---|---|
| 1) Age group | 31 - 40 (46.6%) |
| 2) Occupation | Housewives (36.6%) |
| 3)Duration of sun exposure | 3 - 8 hrs (44%) |
| 4) H/O photosensitivity | 56.6% |
| 5) H/O systemic drugs | 24% |
| 6) H/O topical drugs | 31.3% |
| 7) Duration of onset | > 12 months (28.6%) |
| 8) Location | Malar area, forehead, nose, mandibular (56.6%) |
| 9) Presentation | Bilateral (96.6%) |
| 10) Pattern | Localised (56.6%) |

**Table 7: DISTRIBUTION OF PATIENTS ACCORDING TO THEIR CLINICAL DIAGNOSIS**

| **CLINICAL DIAGNOSIS** | **NO. OF PATIENTS** |
|---|---|
| Melasma | 78 |
| Reihl‘s melanosis | 32 |
| Ochronosis | 15 |
| TSDF | 10 |
| Lichen planus pigmentosus | 5 |
| DLE | 2 |
| Argyria | 2 |
| PDL | 3 |
| Amyloidosis | 2 |
| Poikiloderma of civatte | 1 |

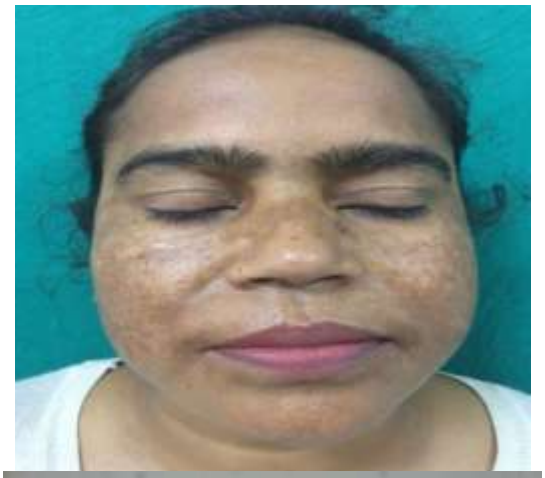
**Table 8. DISTRIBUTION OF PATIENTS ACCORDING TO THEIR HISTOPATHOLOGICAL DIAGNOSIS**

| **HISTOPATHOLOGICAL DIAGNOSIS** | **NO. OF PATIENTS** |
|---|---|
| Melasma | 73 |
| Reihl‘s melanosis | 29 |
| Ochronosis | 9 |
| TSDF | 18 |
| Lichen plans pigmentosus | 4 |
| DLE | 2 |
| PDL | 5 |
| Amyloidosis | 2 |
| Poikiloderma of civette | 1 |

International Journal Dental and Medical Sciences Research
Volume 2, Issue 2, pp: 43-50 www.ijdmsrjournal.com ISSN: 2582-6018

| | |
|---|---|
| Colloid milium | 1 |
| PIH | 6 |

Data was analyzed using Statistical Package for Social Sciences, version 23.0. Chi-square test, kappa test, Independent sample t test were used to compare the data. A p value < 0.05 indicated a statistically significant association. Sensitivity was calculated by dividing true positive with a sum of true positive and false negative multiplied by 100. Specificity was calculated by dividing true negative with a sum of true negative and false positive multiplied by 100. A p value less than 0.05 indicated a statistically significant association.



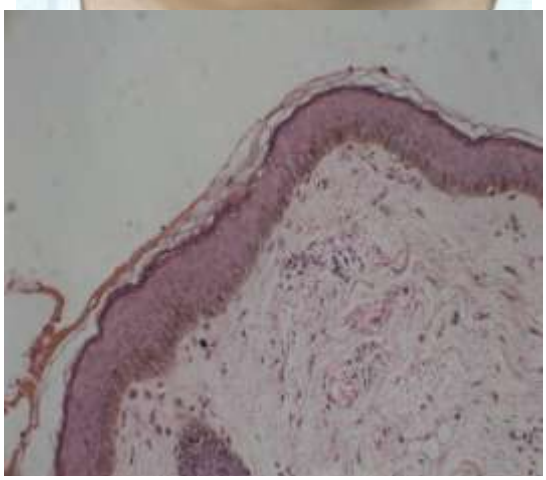


**Figure 1a.** Symmetric brown pigmented macules over malar, cheeks and nose in Melasma
**Figure 1b.** H&E shows increased atrophy, melanin deposition in basal layers and solar elastosis

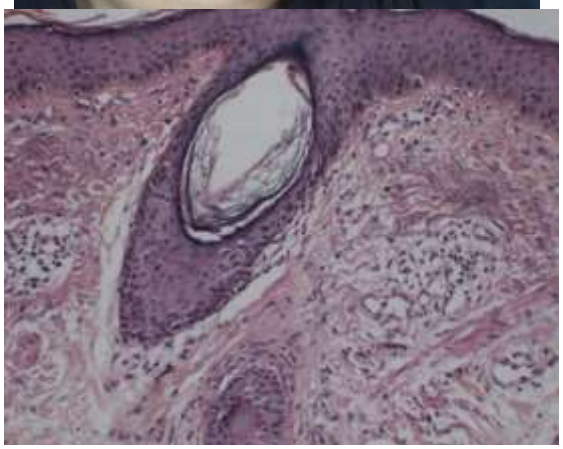


**Figure 2a.** Asymmetrical acquired hyperpigmentation bilaterally in Post Inflammatory Hyperpigmentation
**Figure2b**. H&E showed increased amount of melanin in basal layer of epidermis and pigment incontinence

**Figure 3a.** black brownish hyperpigmentation with erythema over malar, cheeks, nose and around mouth in Pigmented Contact Dermatitis.
**Figure 3b**. H & E shows elongation of rete ridges present, pigment incontinence seen with melanin deposition at basal layers.

## IV. CONCLUSION

The findings of the study showed that hyperpigmentation is an issue of concern especially among most of the females and they don't tend to report it early for treatment. Before consulting dermatologist they generally tend to use topical medication from a chemist without any prescription which effects the clinical presentation and makes it difficult to identify the disease clinically. Melasma and Reihl's Melanosis are commonly clinically overdiagnosed entities. A systematic approach for diagnosis which is the key to successful treatment and management, should be adopted and histopathological correlation is essential before the active treatment planning is done.

## REFERENCES

[1]. Taylor SC, Cook-Bolden F, Rahman Z, Strachan D. Acne vulgaris in skin of color. J Am AcadDermatol 2002;46 2 Suppl:S98-106
[2]. Jablonski NG, Chaplin G. The evolution of human skin coloration. J Hum Evol 2000;39:57-106.
[3]. Sbd.org CensoDermatologico da SBD. Brazilian Society of Dermatology Web page - Dermatological census. [Acesso 1 Dez. 2012]. [Internet] Disponívelem: http://www.s bd.org.br/down/ censo_dermatologico 2006 pdf2012
[4]. Bandyopadhyay D. Topical treatment of melasma. Indian J Dermatol 2009;54:303-9
[5]. Kang WH, Yoon KH, Lee ES, Kim J, Lee KB, Yim H, et al. Melasma: Histopathological characteristics in 56 Korean patients. Br J Dermatol 2002;146:228-37.