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A Cross Sectional Study on Spectrum of Facial Hypermelanosis in a Tertiary Care Centre

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Abstract
Background:
Facial hypermelanoses is one of the most common presentation in Indian patients in dermatology OPD. Pigmentary disorders are actually more frequent in darker races causing cosmetic disfigurement. Facial melanoses, because of their visibility on exposed areas of the body carry significant social, psychological and cosmetic challenges, making their effective management a concern for both the patient and the treating physician. The term facial hypermelanoses encompasses a myriad of entities. So it is essential for a clinician to make an apt diagnosis so as to plan a right treatment modality.
Aims and objectives- *To study the frequencies of all possible entities, which come under the broad term 'facial hypermelanoses'. Also to study the etiology and possible provocating/ aggravating factors of each entity.*
Materials and Methods- *This was a cross sectional observational study done on 100 cases presenting to Dermatology OPD at a tertiary care centre, with the chief complaint of hyperpigmentation over face. Clinical history was taken in detail, cutaneous and systemic examination was done to reach a diagnosis. Wherever necessary, Woods lamp examination, dermoscopy and histopathology were used. All the clinical features were tabulated and analysed to record the frequency of each entity and its possible etiologies.*
Results- *In a tertiary care centre, the mean age of population affected by facial melanoses was 23.77 years with peak at 21-40 years. There was female predominance with male to female ratio of 1:4. All the cases were subcategorised into 15 entities, of which melasma was predominant(57%), followed by post inflammatory hyperpigmentation(10%), periorbital melanosis (9%), seborrheic melanosis (7%), frictional melanoses (4%), lichen planus pigmentosus (3%), 1 case each of actinic lichen planus, fixed drug eruption, Riehl's melanosis, freckle, 2 cases of lentigens, terra firme forme dermatosis, nevus of Ota, Becker's nevus, systemic sclerosis.*
Conclusion- *The term Facial melanoses encompasses a broad number of subentities, of which melasma is the most common. But differentiating and diagnosing the subentity is the essence of management of facial melanoses. Most of the facial melanoses can be diagnosed just on the basis of thorough clinical history and examination. Only few scenarios require additional investigations for precise diagnosis.*
Key Word- *Facial melanoses, melasma, frictional melanoses, terra firme forme dermatoses, seborrheic melanoses.*

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I. Introduction

Facial hypermelanoses is the most common and challenging entity for a dermatologist. It is an umbrella term consisting of a huge number of sub entities, some of which are inherited like generalised lentigenoses, Peutz Jeghers syndrome, nevus of Ota, Hori's naevus; while majority are constituted by acquired pigmentary disorders (either primary dermatologic disorders or secondary to systemic disorders).[1]

Primary dermatologic hypermelanosis include melasma, ashy dermatosis, ephelides, solar lentigo, Riehl's melanosis, periorbital hypermelanosis, peribuccal pigmentation of Brocq, ochronosis, facial frictional melanosis[2], facial acanthosis nigricans, maturational hyperpigmentation[3], actinic lichen planus, lichen planus pigmentosus, erythema dyschromicum perstans, fixed drug eruption, post inflammatory hyperpigmentation. Other causes include Mongolian spots, late-stage failure of cardiopulmonary or renal system, chikungunya fever

and drug/heavy metal induced pigmentation such as with iron, gold, chloramphenicol, tetracycline, amiodarone, pirfenidone, antimalarials and antipsychotics. Systemic disorders include Addison disease, hyperthyroidism, Cushing's syndrome, haemochromatosis and porphyria cutanea tarda.[1,4] Etiology in most of the causes is unknown, but some factors such as UV radiation, hormonal factors in melasma, exposure to chemicals in EDP, exposure to allergens in Riehl's melanosis, insulin resistance in acanthosis nigricans, constant rubbing in frictional melanosis, shadow effect/ stress/ atopy/ allergic contact dermatitis in periorbital hypermelanosis are implicated. Genetic and racial factors are important, the reason for predilection for dark skin.

Based on pathology, etiologies can be • Melanotic hypermelanosis: Due to increased melanin production by normal number of melanocytes. • Melanocytic hypermelanosis: Due to the increased number of melanocytes. • Blue hypermelanosis (ceruloderma): Excess melanin is in dermis [pigmentation is not accentuated under Wood's lamp] due to pigmentary incontinence or dermal melanophages or free dermal melanin or ectopic dermal melanocytes or exogenous pigments deposited in the dermis. • Mixed hypermelanosis: Due to increased epidermal and dermal melanin.[5]

Diagnosis is generally based on clinical features. Most of them are great mimickers of melasma. Few characteristic features elicited by thorough examination and history, sometimes supplemented by Wood's lamp, dermoscopy and histopathological evaluation help us in reaching an apt diagnosis. Right diagnosis is vital in identifying the trigger, deciding the modality of management [topical depigmenting agents like hydroquinone, chemical peels or laser (nevus of Ota etc) apart from vigorous photoprotection and topical corticosteroids, hydroxychloroquine etc in case of variants of lichen planus] and also to assure the chances of complete response to treatment.

II. Material and methods

This was a cross sectional observational study conducted over a period of 4 months from August 2021 to November 2021 in the department of Dermatology of a tertiary care hospital. Strobe guidelines on cross sectional studies were followed. After obtaining informed consent from patients, all the patients attending the outpatient department for facial hyperpigmentation disorders were enrolled in the study. After collecting demographic data, detailed clinical history including occupation and family history was noted. The data of different predisposing factors such as sun exposure, pregnancy, cosmetic use, atopy, stress, diabetes, thyroid disorders chemical/drug exposure, connective tissue diseases and any systemic disorders were recorded and relevant investigations, if any, were carried out to rule out the same. Similarly, skin biopsy and dermoscopy was also done wherever required.

Study design- Observational study (cross sectional)

Study population- All the patients presenting to dermatology OPD for facial hyperpigmentation, following inclusion and exclusion criteria.

Study location- Department of Dermatology, venereology and Leprosy, Kurnool medical college, Kurnool, Andhra Pradesh.

Study duration- August 2021 to November 2021

Sample size- 100 patients

Sample size calculation- For qualitative studies, the formula $4pq/l^2$ is used, where p is percentage of particular variable obtained in previous studies, q is 1-p and l is allowable error (10% of p). Based on this formula and average percentage of melasma(60.5%) in previous studies, we get a minimum sample size was 67. So a total of 100 cases was chosen.

Inclusion criteria- All the patients presenting to OPD with chief complaint of hyperpigmentation over face.

Exclusion criteria- Patients presenting with the primary lesions other than macules and patches over face.

Statistical analysis- All the data pertaining to history and clinical examination is tabulated, especially age, gender, family history, provocating factors like sun exposure, use of over the counter medications, pregnancy, atopy and clinical features, with additional investigations if any. Data thus obtained is analysed using Microsoft excel and SPSS version 21. Mean is calculated for continuous data like age and frequencies, percentages are calculated for categorical data.

III. Result

The study was conducted on 100 patients of facial hypermelanoses, presenting to OPD with hyperpigmentation over face as the main complaint. The youngest patient was a 8 year old male, and the oldest was 52 year old female, with a mean age of 23.77 years. The maximum number of patients that is, 62 % belonged to 21–40 years age group, followed by 27% in 41-60 years and 11 cases below 20 years of age group. There were 20 males and 80 females with male to female ratio of 1:4 (Figure 1). Of total 100 cases, 37 of them belonged to low socioeconomic status. Most of them (43%) were housewives, followed by students 17%, daily wage labourers and maids (16%), farmers (10%), business (9%). In our study, we came across 15 different categories of facial hypermelanoses (Figure 2). Among them, melasma was the most common comprising of 57

patients followed by post inflammatory hyperpigmentation (10%), periorbital melanoses (9%), seborrheic melanoses (7%), facial frictional melanoses (4%), 1 case of pigmented variant of actinic lichen planus and 3 cases of lichen planus pigmentosus and 1 case each of Riehl's melanoses, freckle and lentigens, Nevus of Ota, Becker's nevus, terra firme forme dermatoses, fixed drug eruption and systemic sclerosis. All the cases of facial hypermelanoses were female predominant except for Nevus of Ota in 8 year old boy and cases of actinic lichen planus and Riehl's melanoses in a 50 year old man.

Malar variant of melasma was predominant with 41 cases followed by 11 cases of centrofacial melasma (Figure 3) and 5 cases of mandibular variant. 2 of 11 cases of centrofacial melasma (18.89%) and 4 of 41 cases (10%) of malar melasma developed pigmentation during their pregnancy. 4 of 11 cases (36.36%) of centrofacial melasma and 9 of 41 cases (21.95%) of malar melasma and 2 of 5 cases (40%) of mandibular variant gave a history of daily sun exposure during their work, being farmer and daily wage labourers. Males with melasma had malar and mandibular distribution only, there was no centrofacial variant of melasma in males in this study.

8 of 10 cases of postinflammatory hyperpigmentation (PIH) cases were because of preceding acne (Figure 4), 1 case was post subacute cutaneous lupus rash and other case was post seborrheic dermatitis of face.

2 of 9 cases of periorbital melanoses gave a history of atopy and watering of eyes with a habit of constant rubbing, 1 of 9 cases was under emotional stress and lack of sleep, coinciding with the development of infraorbital melanoses, other case was of a 50 year old woman with lax skin below eyes rendering a shadow effect and appearance of dark circles below eyes.

Cases (7 patients) of seborrheic melanoses had pigmentation at nasolabial folds and labiomental crease. Seborrhoea and acne scars were also noted in 3 of them. All the cases of frictional melanoses gave a history of constant rubbing of skin either with towel after showering or massaging forehead to relieve headache. A case of actinic lichen planus and cases of lichen planus pigmentosus [LPP] (Figure 5) had a positive history of sun exposure by virtue of their occupation as they were farmers. A case of terra firme forme dermatoses had a positive correlation of onset of lesions with sun exposure. A case of fixed drug eruption (FDE) had a pigmented patch over chin secondary to medicines (composition unknown) used for common flu. Majority of the patients gave history of application of topical steroids available as the over the counter fairness or skin lightening creams and native remedies.

Most of the diagnoses were made clinically with detailed history and thorough clinical examination. Cases of melasma exhibited symmetrical hyperpigmentation over face with brownish black colour and accentuation on Woods lamp examination (epidermal variants), except for 1 case which had bluish tinge, with no accentuation on Woods lamp examination. Most of them (71.93%) restricted to malar areas i.e. cheeks and nose (malar variant), 19.30% cases had symmetrical pigmentation over upper lips, forehead apart from malar areas and 8.8% cases had symmetrical pigmentation over ramus of mandible. Facial frictional melanoses had a predilection over forehead, zygoma and temples in our study. A case of actinic lichen planus had violaceous centre with hypopigmented halo over forehead and was asymptomatic. Cases of lichen planus pigmentosus were identified by their slate grey diffuse pigmentation also involving neck and upper trunk and were again confirmed by biopsy. Lesions of Terra firme forme dermatoses (Figure 6) were pigmented, few keratotic and were easily wipable with normal saline. Dermoscopy revealed brown polygonal areas with mosaic pattern. Histopathology showed massive lamellar orthohyperkeratosis layered with clumps of bacteria and dermal perivascular inflammatory infiltrate. Case of nevus of Ota had bluish grey pigmentation below right eye, extending onto zygomatic region and involving sclera of right eye. Case of Becker's nevus (Figure 7) had unilateral oval pigmented patch over left cheek and was associated with hypertrichosis. Cases of lentigenosis (Figure 8) were identified by poorly defined persistent hyperpigmented macules which did not fade in the absence of sun exposure and had no seasonal variations. A case of ephelids had hyperpigmented macules with accentuation on sun exposure and were present over cheeks and nose. A case of pigmented contact dermatoses had a history of hair dye usage with diffuse hyperpigmentation over forehead, face, ear helices and fingers (used to apply dye) (Figure 9).

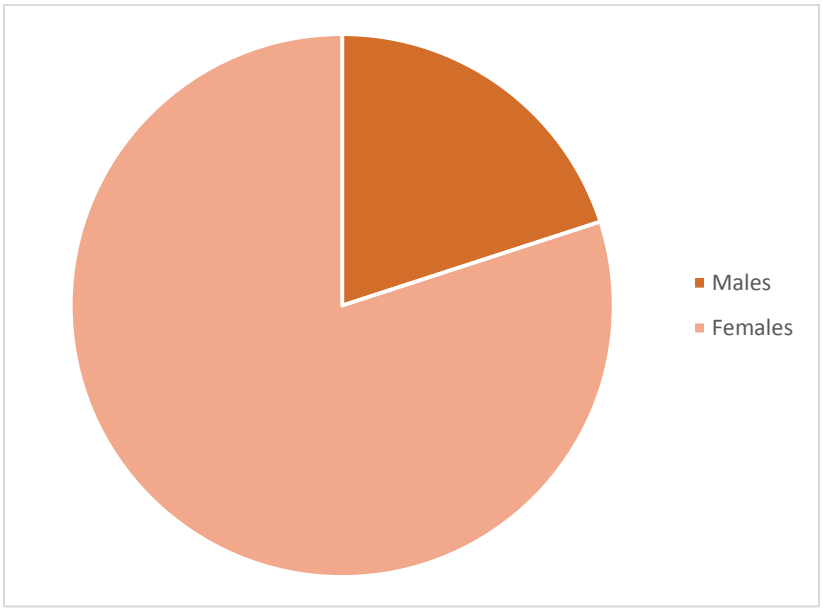

Figure 1- Gender distribution of facial melanosis

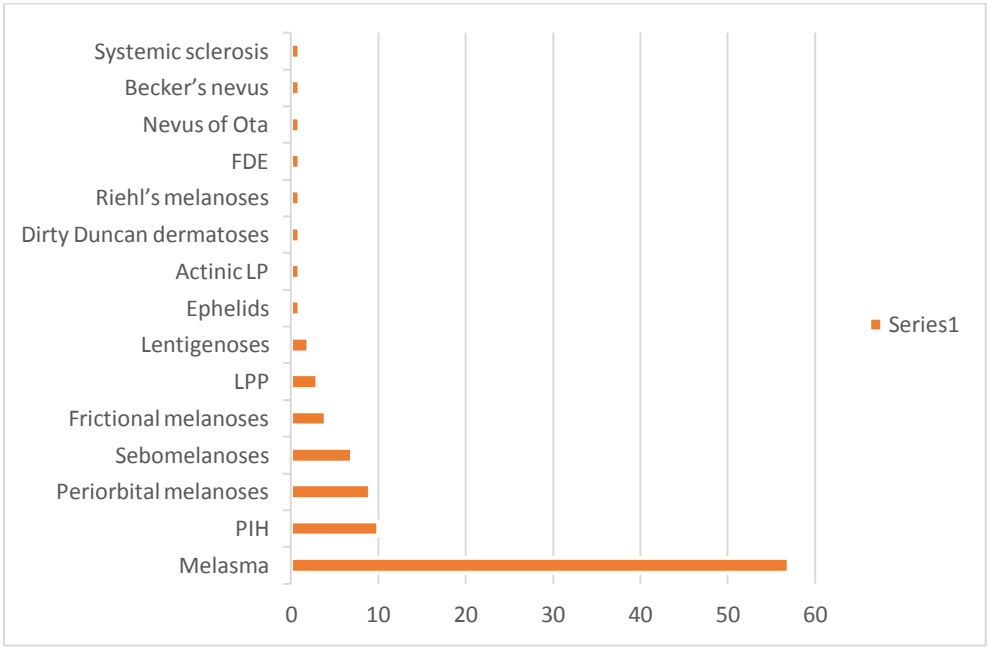

Figure 2- Spectrum of facial melanoses

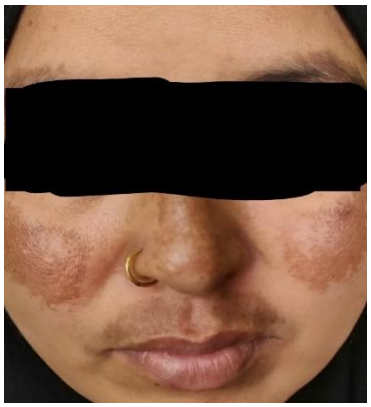

Figure 3- Centrofacial melasma

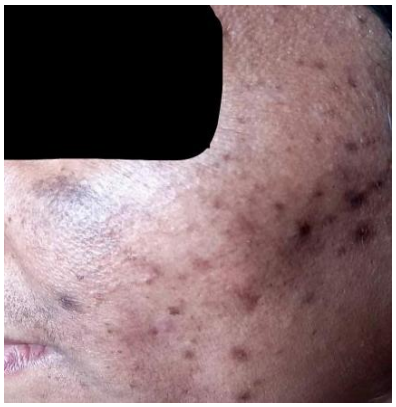

Figure 4- PIH secondary to acne

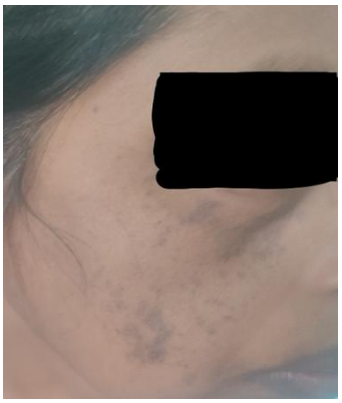

Figure 5- LPP

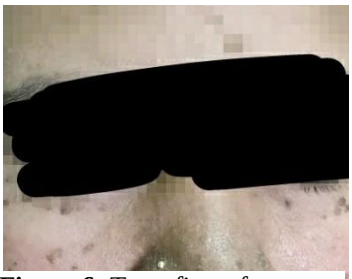

Figure 6- Terra firme forme dermatoses

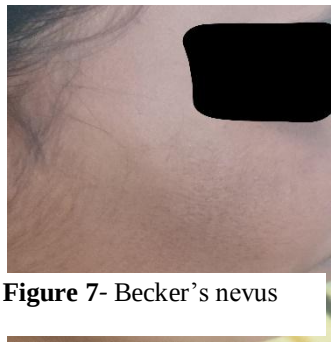

Figure 7- Becker's nevus

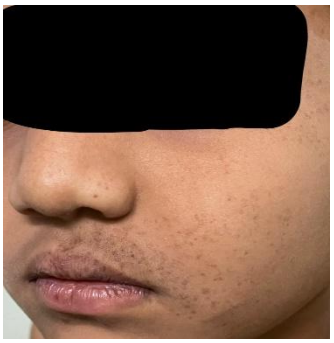

Figure 8- Lentigenoses

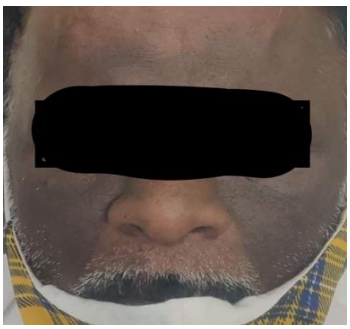

Figure 9- Riehl's melanoses

lV. Discussion

Facial melanoses are one of the major disorders of cosmetic concern, especially in women. It is the most common entity in day to day dermatology practice. The present study was conducted on100 patients presenting with the chief complaint of facial hypermelanoses. Majority (62%) of them belonged to 21-40 years age group with mean age affected being 23.77 years. This is in concordance with the study done by Hassan et al[6], who had majority of the cases of hypermelanoses in third decade. In a study by Amatya et al[4], mean age of participants was 32.7+/- 12.3 years with predominant age group being 16-35 years. In our study, there was female preponderance with male to female ratio of 1:4. Hassan et al had male to female ratio of 1:1.92. 37% belonged to low socioeconomic status. Most of them (43%) were housewives.

In this study, all the cases were segregated into 15 categories. Among them, melasma was the predominant entity (57%). Hassan et al[6] had 35.09% cases of melasma in their study and Amatya et al[4] had 43% cases of melasma in their study. 17.57% cases were males similar to Hassan et al with 15.06% and Achar A et al with 19.87%[6,7]. 26.32% cases gave a history of excess sun exposure by virtue of their occupation. Hassan et al and Achar A et al had 65.75% and 55.13% cases respectively, with sun exposure as aggravating factor[6,7]. Pregnancy was a provocative factor in 14% of melasma cases in our study. As per Achar A et al, in 22.4% cases, pregnancy precipitated melasma[7]. 71.93% cases of melasma were of malar variant similar to other studies by Hassan et al, Goh et al[6,8]. But centrofacial variant was common in Achar A et al, Thapa DM et

al and Katsambas A et al studies[7,9,10]. No case of male centrofacial melasma was reported in our study. So this variation may be due to hormonal factors also apart from environmental factors (Hassan et al suggested regional variations playing a role in deciding the distribution of melasma). On Woods lamp examination, epidermal variants were most common similar to Nicolaidou et al[11]. Finally, based on the history in the cases of our study, we could not elicit a specific etiologic factor in melasma, so etiology may be multifactorial ranging from genetic predisposition to environmental factors, pregnancy, drugs like OCPs. Majority of the patients had a history of self-medication with over the counter fairness creams, topical steroids and home remedies, similar to that reported by Amatya et al and Achar A et al[4,7].

Post inflammatory hyperpigmentation was the second most common entity in this study in concordance with Hassan et al. 80% cases were because of preceding acne similar to findings of other studies by Hassan et al, Taylor et al, once again proving the fact that higher skin types are more prone for PIH following acne[6,12].

9% cases were of periorbital melanoses. 22.22% cases had a history of atopy comparable to study conducted by Hassan et al[6]. Ranu H et al and Sheth PB et al reported atopy in 33% cases in their studies[13,14].11.11% cases reported inadequate sleep, opposed to 7.14% in a study by Hassan et al and 51.1% in Ranu H et al. 1 case had a lax skin and resulting shadow effect was responsible for melanoses.

7% cases belonged to the entity, seborrheic melanoses. It is a term ascribed to focal darkening of some seborrhoeic areas mainly alar grooves, angles of mouth and labiomental crease. This pigmentation lightens on stretching the skin, which was elicited in this study also. In half of the cases, it was accompanied by seborrhoea and acne scars, supporting the role of increased sebum production and seborrheic dermatitis in its etiology, as described by Verma et al[15].

Facial frictional melanoses was observed in 4 cases. It is an acquired disorder due to the habit of constant rubbing. This is evidenced in the present study with history of vigorous rubbing by towel or massaging the forehead. Similar to present study, its location is usually over bony prominences. Squeezing of melanocytes against bone releases melanosomes and thence form dermal melanophages and pigmentation. It is basically a diagnosis of exclusion, after ruling out facial acanthosis, pigmented contact dermatitis, lichen planus pigmentosus, seborrheic melanoses etc[2].

Single case of Riehl's melanoses secondary to hair dye use was reported in the present study, where lesions were asymptomatic. This is discordant with Hassan et al, where the lesions were pruritic[6].

3% cases were of lichen planus pigmentosus with diffuse slate grey pigmentation as described by Bhutani et al[16]. There were no associated skin lesions suggestive of lichen planus, opposed to Hassan et al. Histology revealed basal cell vacuolation change with pigment incontinence, suggestive of old lesions as described by Al-Mutairi et al[17]. A case of actinic lichen planus was diagnosed, which was of pigmented variant. 4 variants of actinic lichen planus exist- annular, pigmented, lichenoid and plaque like. Pigmented variant has to be differentiated from melasma as the treatment options differ like usage of corticosteroids, hydroxychloroquine etc apart from sunscreen. When there is a clinical dilemma, histopathology can be sought. Actinic lichen planus exhibits lichenoid interface dermatitis[18].

Single case of ephelids was reported in the present study, Hassan et al had 6.3% cases[4]. These poorly defined hyperpigmented macules aggravate with sun exposure. In contrast, lentigens do not show any difference with UV exposure and no seasonal variations. This was evident in the present study.

Terra firme forme dermatoses or Duncan's Dirty Dermatoses is a form of retention hyperkeratosis, with sun exposure as a triggering factor. This was evident in our study. Differential diagnoses are acanthosis nigricans, confluent reticulated papillomatosis, epidermal nevi, dermatitis neglecta. Though dermoscopy and histopathology help in reaching diagnosis, simple diagnostic and therapeutic procedure is wiping off the lesions with ethyl alcohol. This was demonstrated in the present study in the form of easily wipable lesions. Occurrence of this disease in hygienic indivisuals rules out dermatitis neglecta. Identification of this disorder is essential as its treatment is simple, requires only cleansing with alcohol and reassurance of patient regarding its benign nature[19].

Other group of hypermelanoses are nevi. Single case of nevus of Ota, type IA, mild orbital type with sclera involvement as described by Khanna et al was diagnosed in this study[5]. Case of Becker's nevus had unilateral cheek involvement with hypertrichosis in post puberty female, consistent with classical descriptions[20].

Diffuse facial pigmentation is a representation of some underlying major systemic disease like systemic sclerosis in the present study. Presence of other markers like raynauds phenomenon, dyspnoea, skin tightening, esophageal reflux etc helped in identifying the etiology of melanoses[21].

V. Conclusion

Facial melanoses have a myriad of etiologies, predominant being melasma. But identifying the specific underlying etiology helps in targeting it with a precise treatment. This is essential in facial melanoses, as years of failed treatment can be treated successfully if causative factor is identified. Psychological issues associated with cosmetic disfigurement can also be diligently tackled. A right diagnosis can be achieved by a good clinical

acumen alone most of the times, especially in resource poor settings. Only few cases require additional investigations like Woods lamp, dermoscopy and histopathology for confirmation. Small sample size in this study is a limitation to present all the variants of facial melanoses. Large multicentric studies are recommended to report all the possible entities of facial melanoses.

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