IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 8 Ser.9 (August. 2020), PP 23-29
www.iosrjournals.org

Hyperpigmentary Disorders of Face – A Study among North Indian Males with Clinico-Histopathological Correlation

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Abstract
The present study was carried out to study the hyperpigmentary disorders (HPD) of face among males.A total of 80 males aged 16-55 years were enrolled. Maximum were students (30%). Malar cheeks / nose/ mandibular forehead were the most commonly affected area (83.8%). Majority had localized pattern (63.75%), had brown or dark brown color (n=62;
77.5%), had mixed type on Wood's lamp examination (n=48; 60%). On the basis of clinical presentation a total of twelve entities were identified - melasma (n=22; 27.5%) followed by PIH (n=12; 15%), Acanthosis nigricans (n=8; 10%), Pigmentary demarcation line and
Macular amyloidosis (n=6; 7.5%), Pigmented contact dermatitis and Drug induced PIH (n=5; 6.25% each). Among less common were- Ashy dermatosis/Erythema Dyschromicum perstans (n=4; 5%), Lichen planus pigmentsosus, PIH with T, faciei, Ochronosis and Nevus of Ota (n=3; 3.75% each). Clinical-Histopathological concordance was seen in 60% cases.

Key Words: *Hyperpigmentation disorders, Melasma, Post-inflammatory disorder, Majocchi's glioma.*

Date of Submission: 01-08-2020 Date of Acceptance: 16-08-2020

I. Background

Pigmentary disorders comprise almost one third of the dermatological consultations.

The incidence, frequency and severity of pigmentary disorders vary across different geographic regions. Hyperpigmentations can be caused by a variety of diseases which may be congenital, with different patterns of inheritance, or acquired forms secondary to cutaneous (cosmetics, perfumes, sun exposure)or systemic problems (mainly hormonal) and often represent paramount causes of emotional distress[1]. Hyperpigmentation in general is due to, increased melanin production by existing melanocytes or from increased proliferation of active melanocytes. They may be classified as epidermal and dermal hyperpigmentaion. Epidermal hyperpigmentation is because of melanin pigmentation and has a brownish hue. Dermal pigmentation is called 'ceruloderma' or 'blue hyperpigmentation' which may either be due to melanin or due to non-melanin pigments[2].

Epidemiological studies have shown a gender-related difference in prevalence of different hyperpigmentation disorders. Mohan[2] reported that hyperpigmentation conditions like erythema dyschromicun perstans, lichen planus pigmentosus, amyloidosis, Berloque dermatitis, Riehl's melanosis are more common among females while conditions like Idiopathic eruptive macular pigmentation, postinflammatory pigmentation and pigmentation due to drugs/Heavy metals affect both the genders equally whereas tar melanosis is more common in males as compared to females.

Although preliminary diagnosis of hyperpigmentary disorders is made on the basis of clinical features alone, however, this approach is unsatisfactory as there are many pigmentary disorders that, clinically, mimick each other and the distinction between them invariably requires astute histopathological evaluation and subsequent clinical correlation[3]. Thus, pathologic examination often serves as a complementary or a confirmative part of the diagnosis. Furthermore, histology-based treatment principles may be helpful for establishing a standardized treatment algorithm for hyperpigmented skin lesions.

Unfortunately, despite these gender differences, most of the literature related with hyperpigmentation is mainly focused on females. Epidemiological studies and clinical visits reveal a higher percentage of most of the hyperpigmentation disorders in women as compared to men and as such the clinical features of different hyperpigmentation disorders and their histopathological correlation specifically in males is less studied. To fill this void, the present study was planned with an aim to describe the hyperpigmentation disorders of face in males visiting a tertiary care facility in northern India.

II. Materials And Method

A total number of 80 male patients aged 16-55 years presenting with facial hypermelanosis attending Outpatient Department of the Department of Dermatology, Venereology and Leprology, Muzaffarnagar Medical

College and Hospital over a period of 18 months starting from January, 2015 to June, 2016 were enrolled in the study after taking informed consent and obtaining approval from Institutional Ethical Committee. Patients with viral infection and those with bleeding disorders were excluded from assessment.

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. Following this, local examination of facial pigmentation was conducted and a record was made of the morphology and distribution of lesions, extent of involvement, colour of pigmentation. Thereafter, Wood's lamp examination was performed. Subsequently, all the patients underwent biopsy procedure surgically. The specimen were then evaluated histopathologically.

III. Results

Age of patients ranged from 16 to 55 years. There were only 3.8% patients aged >50 years. Mean age of patients was 30.95±9.89 years. Students (30%), shopkeepers (18.8%), industrial laours (17.5%) and farmers/labourers (16.3%) comprised the major occupational group.Daily duration of sun exposure was within 2 hours range in nearly half (39patients;

48.75%). However, majority of patients had >2 hours of daily sun exposure (41patients; 51.25%). History of photosensitivity was reported by 19 (23.75%) patients.Systemic drug use history was revealed by 34 (42.5%) patients. However, topical drug use history was reported in 78.75% of patients. Duration of complaints ranged from 1 week to 15 years. Maximum number of patients had duration of complaints from 7-12 months (48.75%) There were 7 (8.75%) patients with onset of disease for >12 months.Malar, cheeks, nose, mandibular and forehead were the most commonly involved locations (83.75%). There were 8 (10%) patients showing involvement of area between malar and temple zone. A total of 3 (3.75% patients) had involvement of lateral side of face and remaining 2 (2.5%) involved angle of mouth to lateral side of chin. Except for 3 (3.75%) patients others had bilateral involvement. In majority

(68.75%) no other area except face was involved, in remaining anterior neck/bilateral arms (2.5%), anterior chest/back/bilateral arms and shoulders (17.5%), nape of neck (7.5%), axilla and groin and sclera of eye (3.75%) were involved. Majority (63.75%) had localized hyperpigmentation. There were 31.25% with diffused and 5% with mottled hyperpigmentation pattern. Exactly half the cases had dark brown discoloration (40patients; 50%) followed by those having brown discoloration (22patients; 27.5%), Gray-brown (7.5%), slate gray (6.25%), light brown (5%) and bluish-gray (3.75%) discoloration. Wood's lamp examination showed the predominance of mixed type (60%) followed by dermal (35%) and epidermal (5%) types (Table 1).

Table 1: Demographic & Clinical Profile of Patients Enrolled in the Study

SN	Characteristic	Total (n=80)
1.	Mean Age±SD (Range)	30.95±9.89 (16-55)
2.	Occupation	
	Farmer/Labourer	13 (16.3%)
	Industrial labour	14 (17.5%)
	Vendor	8 (10.0%)
	Salesperson	5 (6.3%)
	Student	24 (30.0%)
	Shopkeeper/Business	15 (18.8%)
	Others	1 (1.3%)
3.	Daily sun exposure	
	≤2 hrs	39 (48.75%)
	3-8 hrs	41 (51.25%)
4.	Photosensitivity	19 (23.75%)
5.	H/o systemic drug use	34 (42.5%)
6.	Duration since onset	
	<=1 month	7 (8.75%)
	2-3 months	7 (8.75%)
	4-6 months	20 (25.0%)
	7-12 months	39 (48.75%)

	>12 months	7 (8.75%)
7.	H/o topical drug use	63 (78.75%)
8.	Site	
	Malar cheeks / nose/ mandibular forehead	67 (83.8%)
	B/W malar and temple area	8 (10.0%)
	Side of face	3 (3.8%)
	Others	2 (2.5%)
9.	Bilateral	77 (96.25%)
10.	Other affected parts of body	
	None	55 (68.75%)
	Anterior Neck / Bilateral arms	2 (2.5%)
	Anterior chest / Back / Bilateral arms and shoulders	14 (17.50%)
	Nape of neck, axilla, groin	6 (7.50%)
	Sclera of eye	3 (3.75%)
11.	Pattern	
	Diffused	25 (31.25%)
	Localized	51 (63.75%
	Mottled	4 (5.0%)
12.	Color	
	Bluish-gray	3 (3.75%)
	Brown	22 (27.5%)
	Dark brown	40 (50.0%)
	Gray-brown	6 (7.5%)
	Light brown	4 (5.0%)
	Slate gray	5 (6.25%)
13.	Wood's lamp examination	
	Dermal	28 (35.0%)
	Epidermal	4 (5.0%)
	Mixed	48 (60.0%)

Table 2: Distribution of cases according to Clinical & Histopathological Diagnosis (n=80)

SN	**Entity**	**Number**	**%**
Clinical Diagnosis			
1	Melasma	22	27.50
2	PIH	12	15.00
3	Pigmented contact dermatitis	5	6.25
4	Lichen planus pigmentosus	3	3.75
5	Drug induced PIH	5	6.25
6	Ashy dermatosis/Erythema Dyschromicum perstans	4	5.00
7	Pigmentary demarcation line	6	7.50
8	Acanthosis nigricans	8	10.00
9	Macular Amyloidosis	6	7.50
10	PIH+ T. faciei	3	3.75
11	Ochronosis	3	3.75

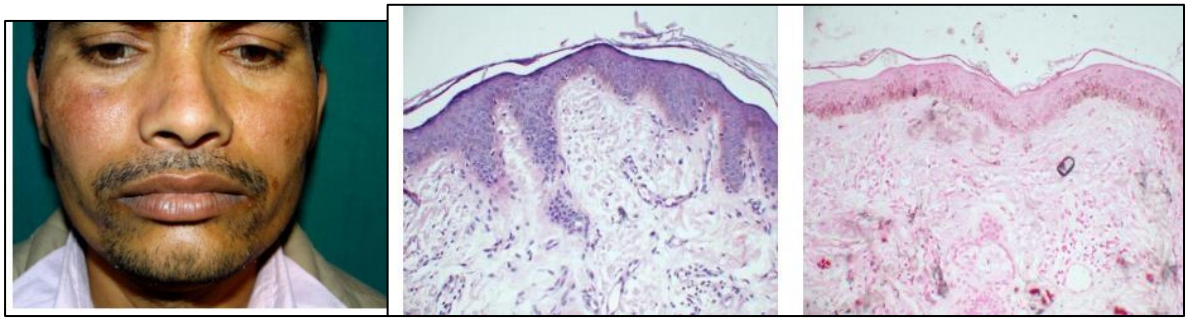
12	Nevus of ota	3	3.75
Histopathological Diagnosis			
1	Melasma	20	25.00
2	PIH	18	22.50
3	Pigmented contact dermatitis	3	3.75
4	Lichen planus pigmentosus	4	5.00
5	Drug induced PIH	1	1.25
6	Ashy dermatosis	3	3.75
7	Pigmentary demarcation line	8	10.00
8	Acanthosis nigricans	6	7.50
9	Macular amyloidosis	5	6.25
10	Nevus of Ota	3	3.75
11	Majochi's granuloma	5	6.25
12	Others	4	5.00

Clinically, as well as histopathologically, melasma, PIH, pigmentary demarcated lines (PDL), Acanthosis nigricans (AN) and pigmented contact dermatitis (PCD) were the most common findings. Though clinical detection rate was higher for melasma, AN and PCD whereas for melasma and PDL, detection rate was higher by histopathology. Majochi's granuloma (MG) was the finding diagnosed histopathologically only (Table 2).

Table 3: Clinicopathological correlation of Major diagnoses

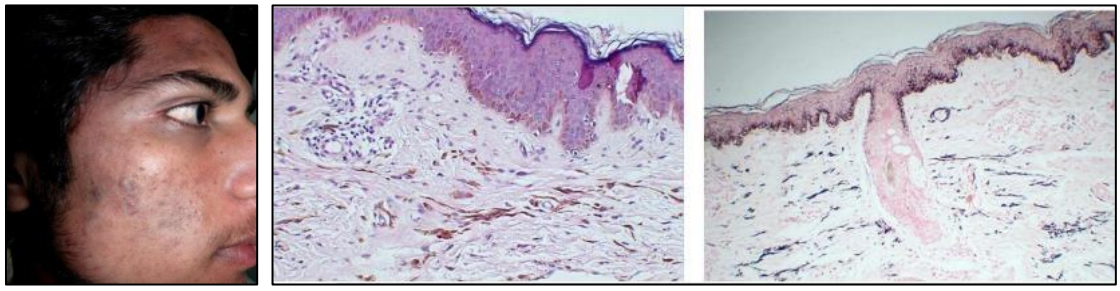
SN	HP Diagnosis	Clinical Diagnosis				Sens.	Spec.	PPV	NPV	% Agreement
		TP	FP	FN	TN					
1.	Melasma	12	10	8	50	60.0	83.3	54.5	86.2	77.5
2.	PIH	10	7	9	54	52.6	88.5	58.8	85.7	80.0
3.	PDL	4	2	4	70	50.0	97.2	66.7	94.6	92.5
4.	Acanthosis nigricans	6	2	0	72	100	97.3	75	100	92.5
5.	Macular amyloidosis	5	1	0	74	100	98.7	83.3	100	95
6.	LPP	3	0	1	76	75	100	100	98.7	98.75
7.	Nevus of Ota	3	0	0	77	100	100	100	100	100
8.	Ashy Dermatosis	3	1	0	76	100	98.7	75	100	98.75
9.	PCD	2	3	1	74	66.7	96.1	40	98.7	95.0

Histopathological correlation was seen in 48/80 (60%) cases. Clinical diagnosis was most sensitive and specific for Nevus of Ota, Ashy dermatois and Acanthosis nigricans. For other diagnoses, the sensitivity ranged from 50% to 66.7%, however, specificity was higher ranging from 83.3% to 97.2% (Table 3).



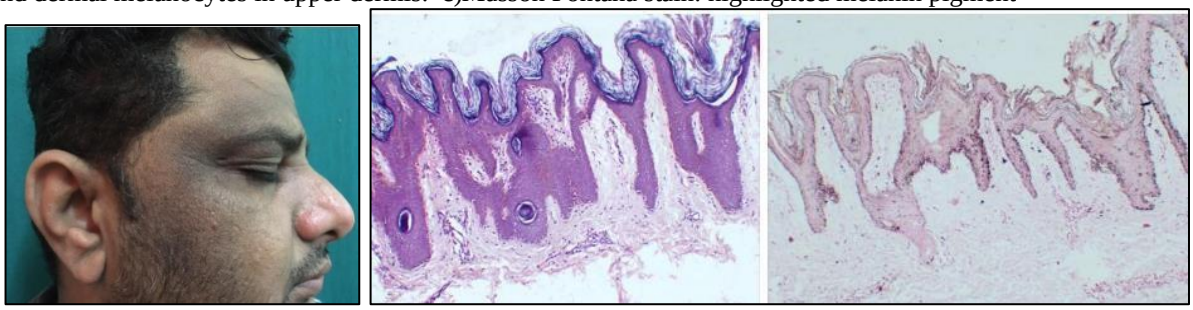
a) **b)** **c)**

i) Melasma a) Symmetric, brown-grayish brown, hyperpigmented macules over malar,cheeks and nose. b) H&E showed melanin deposition in basal and suprabasal layer and melanophages in dermis.c) Masson Fontana highlighted melanin deposition in basal layer



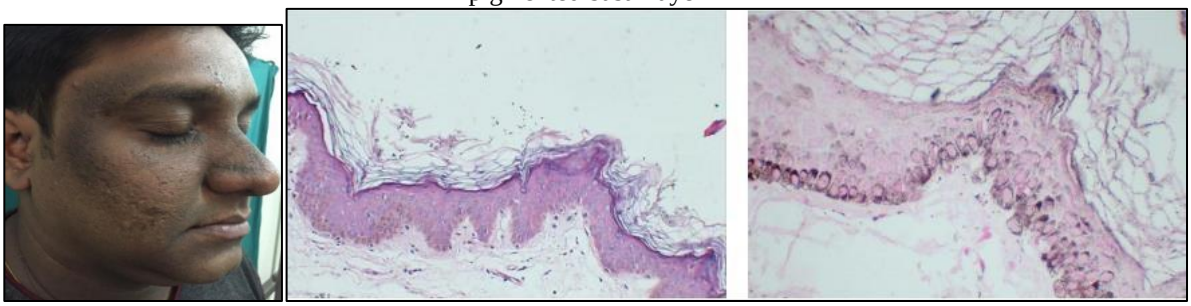
a) **b)** **c)**

ii) Nevus of ota a) H&E showed Blue to grey speckled coalescing macules affecting right forehead, periorbital region, cheeks, malar area with involvement of sclera, b)Dendritic melanocytes scattered along collagen bundle and dermal melanocytes in upper dermis. c)Masson Fontana stain: highlighted melanin pigment



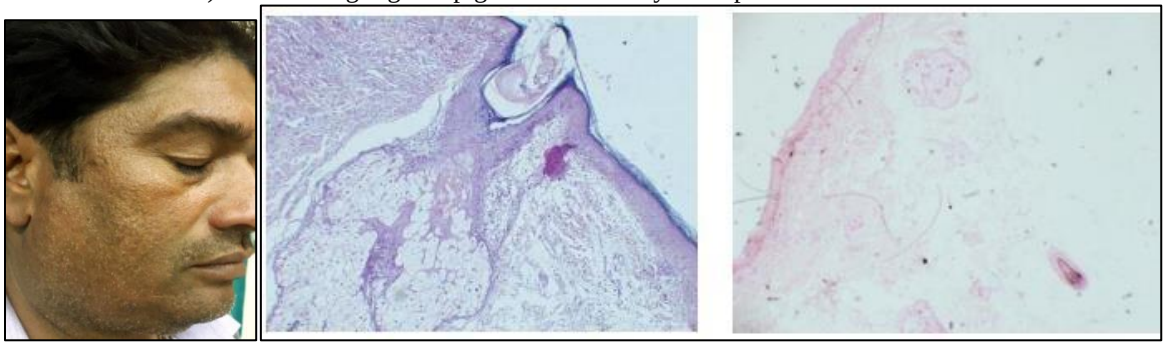
a) **b)** **c)**

iii) Acanthosis nigricans a) Symmetrical macular hypermelanosois over forehead, cheeks, malar, temple and periorbital region b) H&E showed hyperkeratosis, acanthosis and papillomatosis c) MF stain: highlighted pigmented basal layer



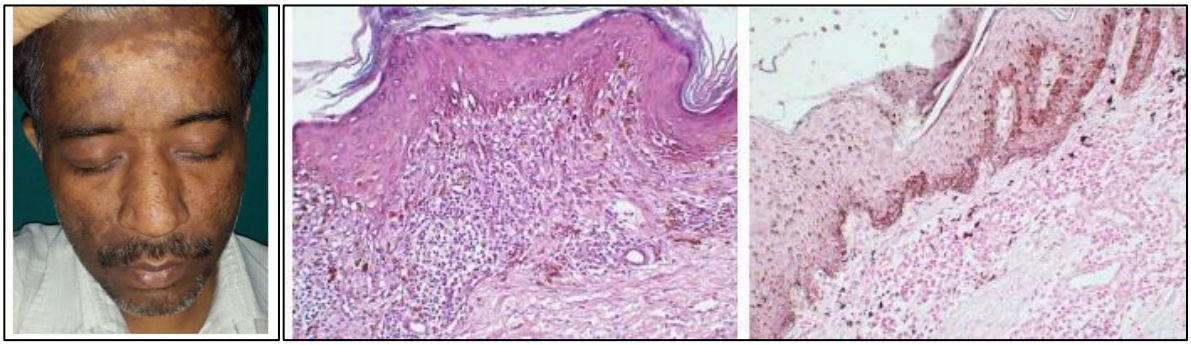
a) **b)** **c)**

iv) Acanthosis nigricans+Tinea faciei a) symmetrical macular hypermelanosis over over forehead, cheeks, malar, temple, nose and periorbital region b) H&E showed hyperkeratosis, mild acanthosis and fungal hyphae in stratum corneum c) MF stain highlighted pigmented basal layer of epidermis



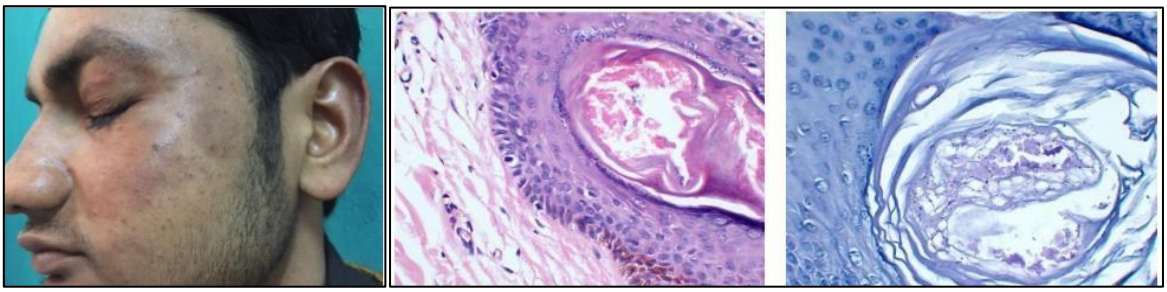
a) **b)** **c)**

v) DLE a) hyperpigmented macule on face in a localised distribution b) H&E showed epidermal thinning with vacuolar degeneration of basal cell and sparse inflammatory infilterate in upper dermis c) MF stain showed mucin deposition in dermis and perivascular infilterate in dermis.



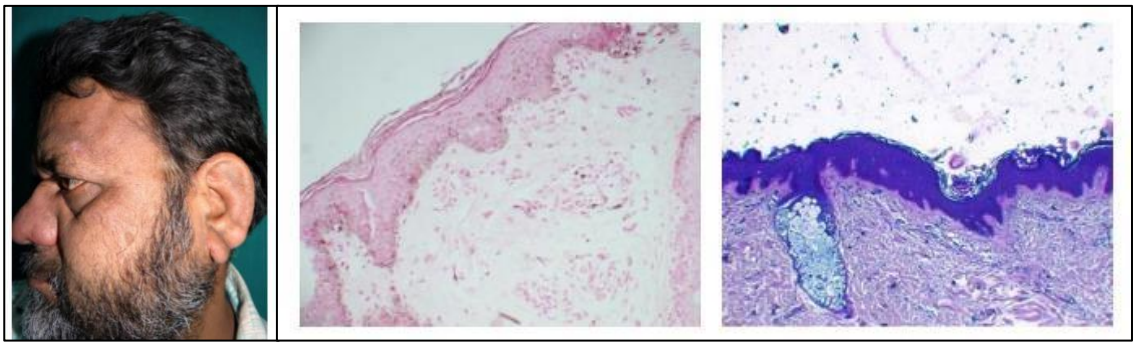
a) **b)** **c)**

vi) Lichen planus pigmentosus a) H&E showed coalescing gray-blue macules over face, neck b) focal bssal cell vacuolization and dermal melanophages c) MF stain showed highlighted dermal melanophages



a) **b)** **c)**

vii) a) Symmetrical hyperpigmented brown color macule over face b) H&E showed fungal hyphae and spore in the hair follicle c) PAS showed fungal spores within hair and hair follicle and surrounding tissue.



a) **b)** **c)**

viii) Macular Amyloidosis a) Symmetrical dark brown macular pigmentation over face b) H&E showed deposition of amyloid in papillary dermis c) Congo Red highlighted amyloid in papillary dermis.

Fig. 1: Clinical and Histopathological Findings of different hyperpigmentation disorders

IV. Discussion

The present study showed melasma, PIH, Acanthosis nigricans, Pigmentary demarcation line and Macular amyloidosis as the major diagnoses both clinically as well as histopathologically. A higher percentage of students indicates cosmetic concern. Prolonged sun exposure was the major risk as reported in other studies too[4,5].

Although melasma is reported to be more common in females as compared to males[6,7], however, the present study melasma was found to be the most dominant finding among males. However, for the diagnoses like PDL where male-female ratio has been reported to be as low as 0.04[8], the proportion of patients in present study was relatively lower (6.25%). With respect to absolute clinical failure to diagnose MG, it can mainly be attributable to its varied clinical presentations and deep-rooted pathology[9].

In present study, clinical diagnosis was most sensitive and specific for Nevus of Ota, Ashy dermatosis and Acanthosis nigricans, however, for other diagnoses, clinical diagnosis lagged adequate sensitivity. In previous reports too, clinical diagnosis has shown to often miss certain diagnoses as the clinical features are nonspecific in nature[3,10,11]. The diagnoses like Nevus of Ota and Ashy dermatosis have strong clinical features that are able to differentiate them from other diagnoses.

The findings of present study provided an overview of hyperpigmentation disorders of face in males and stresses on the need for a histopathological correlation for effective management.

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Dr.Tarang Goyal, et. al. "Hyperpigmentary Disorders of Face – A Study among North Indian Males with Clinico-Histopathological Correlation.*" IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(8), 2020, pp. 23-29.