



## COMMON PIGMENTED SKIN LESIONS; PATTERN AND DISTRIBUTION.

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**ABSTRACT... Objectives:** The purpose of this study is; firstly, to study the histopathological spectrum of the pigmented skin lesions in the community, to signify that not all pigmented skin lesions are malignant melanomas; secondly, to assess the age-wise distribution of the common pigmented skin lesions; and thirdly, to determine the commonly affected body sites by these pigmented skin lesions. **Study Design:** Retrospective/Observational study. **Setting:** Charsada Teaching Hospital affiliated with Jinnah Medical College Peshawar. **Period:** 100 consecutive cases with clinical diagnosis of pigmented skin lesion, starting in the year 2013. **Methods:** In this study, 100 consecutive surgical pathology cases with clinical diagnosis of pigmented skin lesion were retrieved from the archives of Charsada Teaching Hospital affiliated with Jinnah Medical College Peshawar. All the specimens were incisional biopsies of skin, fixed in 10% formalin, embedded in paraffin, and stained with Hematoxylin and Eosin stains. **Results:** On analyzing 100 consecutive pigmented skin lesions (n=100) starting from the year 2013, it was found that the large majority of these lesions were benign. The most common pigmented skin lesion was melanocytic nevus. Moreover, majority of pigmented skin lesions were seen in females. Seborrheic keratosis and malignant tumors, like basal cell carcinoma and squamous cell carcinomas, were more commonly seen in males in the 6<sup>th</sup> and 7<sup>th</sup> decades of life; whereas, dermatofibroma and post-inflammatory pigmentation were more common in females in the 4<sup>th</sup> and 5<sup>th</sup> decades of life. Overall, the pigmented skin lesions were more common in the 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> decades of life with peak in the 4<sup>th</sup> decade. Skin of face was the most common site affected by melanocytic nevi and malignant epidermal skin tumors. **Conclusions:** In conclusion, most of the pigmented skin lesions are benign, encountered in the 4<sup>th</sup> decade of life, and commonly affect the skin of face. Also, most of the melanocytic nevi are encountered in females, while most of the malignant epidermal neoplasms are encountered in males affecting the skin of face.

**Key words:** Pigmented Skin Lesions, Basal Cell Carcinoma, Seborrheic Keratosis, Melanocytic Nevus, Epidermal Nevus, Dermatofibroma.

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### INTRODUCTION

Pigmented skin lesions are frequently encountered in Dermatology and Plastic Surgery Clinics. Patients seek consultation primarily for cosmetic reasons or when they are scared of any possible malignancy developing in an enlarging pigmented skin lesion.

Skin is the largest organ of the body comprising of epidermis, dermis containing skin adnexal structures, and subcutaneous tissue. The epidermis is mainly composed of keratinocytes with scattered few melanocytes, Langerhans cells, and Merkel cells. Melanocytes produce

melanin that protects against injurious UV light.<sup>1</sup> Melanin pigment is usually present in nevocellular nevi and malignant melanoma, but also in other non-nevoid skin tumors like seborrheic keratosis, basal cell carcinoma, some squamous cell carcinomas, schwannoma, and dermatofibrosarcoma protuberans, etc.<sup>2</sup> Pigmented skin lesions are common in all age groups and more so in fair colored individuals. The number of melanocytes is the same in fair-colored and dark-colored skins and the skin color depends on the number, size, and distribution of melanosomes in the epidermis.<sup>1</sup>

The purpose of this study is; firstly, to study the previously unvisited histopathological spectrum of pigmented skin lesions in the community and to signify that not all pigmented skin lesions are malignant melanomas; secondly, to assess the age-wise distribution of the common pigmented skin lesions; and thirdly, to determine the distribution of pigmented skin lesions with regards to body site.

## METHODS

In this retrospective pathology laboratory based study, 100 consecutive pigmented skin lesions (n=100) were reviewed starting from the year 2013. All the cases with clinical diagnosis of pigmented skin lesion were retrieved from the archives of Charsada Teaching Hospital affiliated with Jinnah Medical College Peshawar. All the included cases had incisional skin biopsy, fixed in 10% formalin, embedded in paraffin, and thin sections were stained with Hematoxylin and Eosin stains. The slides and diagnoses of all the retrieved cases were reviewed and all the data analyzed according to diagnosis, age, and affected body site. Epidermal nevus is a diverse group of entities encompassing hamartomatous proliferation of different epithelial structures in the skin and in this study, it is used to imply localized epidermal keratinocyte proliferation only. The "face" as mentioned in this study includes forehead, nose, cheeks, chin, and mandibular skin. The "neck" includes skin of the front, sides, and back of the neck. The "abdomen" includes the anterior and lateral abdominal wall skin. The "back" includes posterior thoracic and posterior lumbar skin. The "upper limb" is self-explanatory. The "thigh" includes area from inguinal crease to the knee.

## RESULTS

On analyzing 100 consecutive pigmented skin lesions (n=100) starting from the year 2013, it was found that the large majority of these lesions were benign (93%), while only few were malignant (7%). Moreover, majority of pigmented skin lesions (mostly represented by melanocytic nevi) was seen in females (Table I). Seborrheic keratosis and malignant tumors, like basal cell carcinoma and squamous cell carcinomas, were

more common in males; whereas, dermatofibroma and post-inflammatory pigmentation were more common in females (Table I). Overall, pigmented skin lesions were more common in the 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> decades of life with peak in the 4<sup>th</sup> decade (Table II). Melanocytic nevi and dermatofibromas were most common in the 4<sup>th</sup> decade; seborrheic keratosis was most common in the 6<sup>th</sup> decade; whereas, malignant tumors were more common in the 6<sup>th</sup> and 7<sup>th</sup> decades. Skin of the face (n=64) followed by the back (n=10) were the most common sites for pigmented skin lesions (Table-III).

	Diagnosis	Male	Female	Total
1.	Melanocytic nevi	16	57	73
2.	Seborrheic keratosis	6	3	9
3.	Basal cell carcinoma	4	2	6
4.	Epidermal nevus	2	3	5
5.	Dermatofibroma	1	2	3
6.	Post-inflammatory pigmentation	1	2	3
7.	Squamous cell carcinoma	1	-	1
	<b>Total</b>	<b>31</b>	<b>69</b>	<b>100</b>

Table-I. Distribution of pigmented skin lesions according to Gender.

## DISCUSSION

Skin is the largest organ of the body accounting for 15% of the body weight. It forms a barrier against external hostile environment in addition to performing multiple other functions.

The skin comprises of epidermis, dermis (containing skin adnexal structures), and subcutaneous tissue. Epidermis is composed mostly of keratinocytes (90%-95%) while melanocytes, Langerhans cells, and Merkel cells constitute the rest of the cells (5%-10%). Melanocytes are derived from neural crest and are located at the basal layer in ratio of one melanocyte for every four- to ten basal keratinocytes (1:4-10).

	Diagnosis	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	Total
1.	Melanocytic nevi	-	4	22	28	16	3	-	-	73
2.	Seborrheic keratosis	-	-	-	-	1	3	4	1	9
3.	Basal cell carcinoma	-	-	-	-	1	2	2	1	6
4.	Epidermal nevus	2	3	-	-	-	-	-	-	5
5.	Dermatofibroma	-	-	-	2	1	-	-	-	3
6.	Post-inflammatory pigmentation	-	-	-	1	1	1	-	-	3
7.	Squamous cell carcinoma	-	-	-	-	-	-	-	1	1
	<b>Total</b>	2	7	22	31	20	9	6	3	<b>100</b>

Table-II. Distribution of pigmented skin lesions according to Age.

	Diagnosis	Face	Neck	Back	Abdomen	Thigh	Upper limbs	Total
1.	Melanocytic nevi	51	8	4	5	4	1	73
2.	Seborrheic keratosis	2	1	3	3	-	-	9
3.	Basal cell carcinoma	6	-	-	-	-	-	6
4.	Epidermal nevus	3	-	2	-	-	-	5
5.	Dermatofibroma	-	-	-	-	3	-	3
6.	Post-inflammatory pigmentation	1	-	1	-	-	1	3
7.	Squamous cell carcinoma	1	-	-	-	-	-	1
	<b>Total</b>	64	9	10	8	7	2	100

Table-III. Distribution of pigmented skin lesions according to body site.

Melanocytes are smaller than the surrounding basal keratinocytes, have ovoid nuclei with perinuclear halo, and dendritic cytoplasmic processes. They produce melanin that protects against injurious UV light.<sup>1</sup> Melanin pigment is usually present in nevocellular nevi and malignant melanoma, but also in other non-nevoid skin tumors like seborrheic keratosis, basal cell carcinoma, some squamous cell carcinomas, schwannoma, dermatofibrosarcomaprotuberans, etc.<sup>2</sup> Pigmented skin lesions are common in all groups and more so, in fair-colored individuals. It is interesting to note that the number of melanocytes is the same in fair-colored and dark-colored skins and the skin color depends on the number, size, and distribution of melanosomes in the epidermis.<sup>1</sup>

On analyzing 100 consecutive pigmented skin lesions (n=100) starting from the year 2013, received in the Pathology Laboratory of Charsada Teaching Hospital affiliated with Jinnah Medical College Peshawar, it was found that seven diagnostic categories constituted these 100 consecutive cases. Majority of the pigmented skin lesions were benign (93%) and melanocytic nevus (73%) was the most common diagnostic category. Seborrheic keratosis (9%) was the

second most common, followed by basal cell carcinoma (6%), epidermal nevus (5%), post-inflammatory pigmentation and dermatofibromas (each, 3%), and squamous cell carcinoma (1%).

Melanocytic nevus (73%) was the most common diagnosis in this study. It was found to be more common in females (n=57) with a male-to-female ratio of 1:3.6 (Table-I). Melanocytic nevi were most common in the 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> decades of life (Table-II) with peak incidence in the 4<sup>th</sup> decade (n=31) and were most commonly encountered on the face (n=51) (Table-III). These findings are in accordance with those of Laihsramet al.<sup>2</sup> Melanocytic nevi are characterized clinically by flat- to dome shaped, flesh- to dark brown colored, and solitary- to multiple skin lesions.<sup>3</sup> There are two commonest histologic subtypes of melanocytic nevi, i.e. intradermal and compound melanocytic nevi. The intradermal melanocytic nevi are histologically characterized by symmetrical proliferation of melanocytes in the upper and mid dermis with downward maturation; while, compound melanocytic nevi show, in addition, junctional melanocytic activity. Melanocytic nevi are hamartomas/benign neoplasms showing mutations in BRAF and NRAS genes, it is also the same gene that is affected in malignant

melanomas.<sup>4</sup> “Nevi of special site” is a specific group of nevi that presents in certain anatomic locations (the embryonic milk line, i.e. breasts, axillae, umbilicus, genitalia, and flexural areas as well as acral surfaces, i.e. ear and scalp) with histologically worrisome features but nonetheless exhibit benign behavior.<sup>5</sup>

Seborrheic keratosis (9%) was the second commonest diagnosis in this study. It was found to be more common in males (n=6) with male-to-female ratio of 2:1 (Table-I). It was most common in the 6<sup>th</sup> and 7<sup>th</sup> decades of life (Table-II), affecting the abdomen (n=3) and back (n=3) equally (Table-III). Laishram et al in their study of 183 cases also found it to be the second most common benign epidermal tumor, but more common in females,<sup>2</sup> though no gender predilection has been reported in the literature. It presents as a dome-shaped, protruding, sharply circumscribed, brown-black lesion characterized by “stuck on” appearance, having greasy surface. It can occur on any part of the body except the palm and sole<sup>3,6</sup> with particular predilection for trunk, forehead, and scalp. Microscopically, these are characterized by proliferation of basaloid keratinocytes, containing scattered keratin-filled invaginations (pseudo-horn cysts), and small keratin-filled (horn) cysts; melanin pigmentation is increased in the basal keratinocytes. The etiology of this disease is not well known; however, the role of sunlight and mutations in Fibroblast Growth Factor Receptor 3 (FGFR3) gene have been suggested as etiological factors.<sup>7</sup> Seborrheic keratosis has been reported to be one of the most common skin tumors seen by dermatologists in their daily clinical practice.<sup>8</sup>

Basal cell carcinoma (6%) was the third most common diagnosis and most common skin malignancy. It was found most commonly in males (n=4) with male-to-female ratio of 2:1 (Table-I). It was most frequently encountered in the 6<sup>th</sup> and 7<sup>th</sup> decades (each, n=2) of life (Table-II) and was seen exclusively on the face (n=6) (Table-III). It presents in old age, in fair-skinned individuals, and on sun damaged skin as nodules that ulcerate at their centers. Basal cell carcinoma accounts for 70% of all malignant skin tumors making it the most common malignant

skin tumor and up to 80% of these lesions are seen on the head and neck.<sup>11</sup> They usually arise from the basal layer of the skin and outer root sheath of pilosebaceous units that are damaged by excessive UVB.<sup>9,10,11</sup> Alcohol consumption has been reported to increase the risk of basal cell carcinoma<sup>12</sup>. Also, renal transplant patients are at an increased risk of developing this tumor.<sup>11</sup> Histologically, these are characterized by nests of basaloid cells attached to the basal cell layer of the epidermis with peripheral palisading and showing frequent clefting at the stromal-tumor interface.<sup>11</sup> Dark color is imparted to the tumor by increase in the melanin pigment, scattered melanocytes, and scattered hemorrhages.<sup>13</sup>

Epidermal nevus (5%) was the fourth commonest diagnosis; it was slightly more common in females than in males with a male-to-female ratio of 1:1.5 (Table-I). It was most common in the 1<sup>st</sup> (n=2) and 2<sup>nd</sup> (n=3) decades of life (Table-II). The commonest sites affected were the face (n=3) and mid-back (n=2) (Table-III). These hamartomatous lesions have incidence of 1 in 1000 live newborns, with predilection for the head and neck, trunk, and extremities, it is noticeable at birth, but becomes thick, dark, and verrucous at puberty.<sup>14</sup> It may present as a solitary, linear or multiple verrucous, or plaque-like velvety lesions, often following Blaschko’s lines. It may occur randomly or be part of a syndrome. The finding of an epidermal nevus warrants complete physical examination to rule out association with other syndromes.<sup>14</sup> Histologically, it is characterized by papillomatosis, hyperkeratosis, focal acanthosis, hypergranulosis, and an increase in the basal layer melanin pigment.<sup>3</sup>

Both dermatofibroma (3%) and post-inflammatory pigmentation (3%) were the fifth commonest pigmented skin lesion diagnoses. Dermatofibromas were more common in females (n=2) with a male-to-female ratio of 1:2 (Table I). It was more common in the 4<sup>th</sup> decade (n=2) of life (Table-II) commonly affecting the thigh (n=3) (Table-III). It usually presents as a painless nodule in the dermis with “button-hole sign”.<sup>15</sup> Microscopically, it is characterized by proliferation of fibrocollagenous tissue in whirling

pattern, containing scattered macrophages, and occupying the upper, mid and lower dermis; separated from the epidermis by a Grenz zone, poorly demarcated laterally, and rarely extending into the upper subcutis as thin septae or as a well-demarcated bulge.<sup>9,10,11</sup> The dark hue imparted to the skin overlying the dermatofibroma is due to the increase in number of melanin-producing melanocytes in the epidermis.<sup>16</sup>

Post-inflammatory pigmentation (3%) or acquired melanosis was commonly found in females (n=2) with male-to-female ratio of 1:2 (Table-I). Its distribution was equal in the 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> decades (each, n=1) of life (Table-II), the affected sites being the face, back, and upper limbs (each, n=1) (Table-III). It may follow different inflammatory skin conditions especially those causing damage to the basal layer, these include lichenoid skin disorders like lichen planus and lichenoid drug reactions.<sup>3</sup> Post-inflammatory dark hue is due to increased amount of melanin in the basal layer of epidermis. Dispersion of melanin in the epidermis and its uptake by keratinocytes (epidermal hypermelanosis) imparts light- to dark brown hue to the skin, while incontinence of melanin in the papillary dermis and subsequent uptake by macrophages (dermal hyperpigmentation) imparts blue-gray hue to the skin.<sup>17,18</sup>

Squamous cell carcinoma (1%) was the 6<sup>th</sup> most common diagnosis and the second most common skin malignancy, it was found on the face of a male patient (Table-I) who was in the 8<sup>th</sup> decade of life (Table-II). It arises in the sunlight (UVB) damaged skin of fair-colored people; nearly all of these actinic-induced tumors are preceded and accompanied by lesions of actinic keratosis<sup>6</sup>, the commonly affected sites include face, neck, and dorsum of hands. Renal transplant patients are at an increased risk of developing this tumor.<sup>11</sup> They present as focal nodular skin thickening with crusting and later, necrosis at the center causing central ulceration. It is histologically characterized by proliferation of squamous cells with variable degree of differentiation, forming keratin pearls, squamous eddies, and individual cell keratinization. The larger tumors show areas of necrosis.<sup>6,9,10,11</sup> The dark hue of the tumor is due

to scattered melanocytes in the tumor, abnormal thickening of the epidermis, and scattered hemorrhages.<sup>19,20</sup>

Contrary to the common belief, most of the pigmented skin lesions (93%) in this study were benign and no case of malignant melanoma was encountered. Melanocytic nevi (73%) were the most common excised pigmented skin lesions and were most often seen in females. These findings are consistent with the findings of the study of 183 patients by Laishram et al.<sup>2</sup> The pigmented skin lesions more commonly seen in males were seborrheic keratosis (9%), and malignant epithelial tumors like basal cell carcinoma (6%) and squamous cell carcinoma (1%).

Pigmented skin lesions were more common in the 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> decades of life with peak incidence in the 4<sup>th</sup> decade. Face (n=64) was the most common site affected by pigmented skin lesions, followed by the back (n=10), neck (n=9), abdomen (n=8), thigh (n=7), and upper limbs (n=2). These findings are almost in accordance with the findings of Laishram and colleagues<sup>2</sup>, who studied 183 patients of pigmented skin lesions, with the exception that peak incidence, was reported in the third decade of life.

In conclusion, it is to be remembered that most of the pigmented skin lesions are benign, encountered in the 4<sup>th</sup> decade of life, and commonly affect the skin of face. Also, most of the melanocytic nevi are encountered in females, while most of the malignant epidermal neoplasms are encountered in males.

### Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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2	Abdul Shaheed Asghar	Concept and design, Data analysis and interpretation, Manuscript drafting, Manuscript revision.	
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