

A Retrospective Analysis of the Prevalence and Patterns of Hyperpigmented Skin Disorders in a Dermatology OPD

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Abstract:**Background:** Hyperpigmented skin disorders are common dermatological conditions, particularly in populations with darker skin types, and have significant cosmetic and psychosocial impact.**Aim:** To analyze the prevalence and patterns of hyperpigmented skin disorders in a dermatology OPD.**Methodology:** A retrospective, hospital-based descriptive study was conducted over 8 months in the Department of Skin & VD, Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar. A total of 90 patients with clinically diagnosed hyperpigmented disorders were included. Data were analyzed using descriptive statistics.**Results:** The majority of patients belonged to the 21–30 years age group (24.44%), with female predominance (57.78%). Melasma (28.89%) was the most common disorder, followed by post-inflammatory hyperpigmentation (24.44%). The face was the most frequently affected site (44.44%). Most patients (31.11%) presented within 6 months of lesion onset.**Conclusion:** Hyperpigmented disorders are highly prevalent, especially among young females, with melasma and post-inflammatory hyperpigmentation being the most common. Early presentation and predominant facial involvement highlight the need for timely diagnosis and preventive strategies.**Keywords:** Hyperpigmentation, Melasma, Post-inflammatory hyperpigmentation, Dermatology OPD, Prevalence.**DOI:** 10.25258/ijpqa.17.4.10

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Introduction

Human skin is a broad range of colors and tones, which depend on various intrinsic and extrinsic factors, including race, ethnicity, climatic conditions, ultraviolet (UV) exposure, anatomical location, and lifestyle patterns [1]. Of these, melanin is the most important since it is the main determinant of skin pigmentation. The melanin is produced by specialized dendritic cells called melanocytes, which are found in the basal layer of the epidermis. These melanocytes synthesize melanin in intracellular organelles known as melanosomes and then pass it to the surrounding keratinocytes. Anatomically and physiologically, a single melanocyte provides melanin to about 36 keratinocytes, which constitute what is known as the epidermal melanin unit. The visible color of the skin and its variations among individuals and populations are largely dependent on the type, amount, and distribution of melanin.

Hyperpigmentation is a term used to describe a set of conditions that are associated with the darkening of the skin as a result of excess production of melanin, abnormal pigment distribution, or deposition of other endogenous or exogenous pigments. These disorders may occur in a variety of pathogenic ways and may manifest themselves in local or generalized foci of hyperpigmentation. A hyperpigmented disease can be caused by a single or a combination of processes. These are an augmentation of epidermal melanin as seen in ephelids, lentigines, tanning, nevus of Ota, and Becker nevus. Alternatively, there can be more dermal melanin deposition in such disorders as lichen planus, lupus erythematosus, post-inflammatory hyperpigmentation, and incontinentia pigmentata. Other contributing factors include hemosiderin deposition in hemosiderosis, increased blood flow as seen in hemangiomas or superficial hemorrhages, thickening of the stratum corneum in conditions like pityriasis versicolor and acanthosis

nigricans, presence of blood in the stratum corneum such as in black heel, and deposition of exogenous or endogenous pigments in the dermis as in ochronosis and tattoos [2].

Hyperpigmented skin disorders constitute a large percentage of dermatological conditions that are presented in outpatient departments (OPDs), especially in nations with darker skin phototypes [3]. Pigmentary disorders are particularly prevalent in India, where most of the population falls into Fitzpatrick skin types IV to VI, and frequently form a significant cause of dermatology visits. The Indian skin is predisposed to pigmentation abnormalities because of the high activity of melanocytes and the sensitivity to inflammatory and environmental factors. Persistent post-inflammatory hyperpigmentation can be caused by even minor cutaneous insults like acne, infections, allergic reactions, or mechanical trauma and may have a long course and significant cosmetic effects [4].

The clinical spectrum of hyperpigmented disorders is wide and includes both congenital and acquired disorders. The most common acquired causes are melasma, post-inflammatory hyperpigmentation, acanthosis nigricans, pigmentation caused by drugs, and pigmentary alterations in systemic diseases. Moreover, hyperpigmentation can also be caused by infections, endocrine disorders, nutritional deficiencies, and exposure to some chemicals or medications [5]. The conditions can be very diverse in their clinical manifestation, distribution, severity, and symptoms, and proper diagnosis and classification are necessary to manage them.

In addition to the physical manifestations, hyperpigmented disorders can have serious psychosocial consequences. Emotional distress, low self-esteem, and poor quality of life may be caused by visible pigmentation, particularly on exposed parts of the body like the face and neck [6]. This is especially applicable among the younger people and in cultures where looks are significant in social and work relations. Although these conditions are mostly benign in nature, they may have a significant psychological effect, which is why it is important to diagnose them as soon as possible and provide effective therapeutic interventions.

Epidemiologically, it is important to know the prevalence and trend of hyperpigmented skin disorders in a given population due to a number of reasons [7]. It helps in identifying the most common etiological factors, recognizing demographic trends, and planning targeted healthcare strategies. In addition, the distribution and pattern of these disorders can be greatly affected by regional differences in climate, cultural practices, occupational exposure, and genetic predisposition. Thus, research in particular geographic areas can be useful in understanding the disease burden in the area and help clinicians to

create context-specific diagnostic and management strategies.

A retrospective study in an outpatient dermatology clinic provides an effective and convenient way to assess these trends. Through the analysis of the past documented clinical data, one can determine the frequency, distribution, and the nature of hyperpigmented disorders experienced within a specified time. This method saves time and resources and also enables a bigger sample size to be included, which increases the reliability of the results. Also, retrospective studies may indicate the trends over time and reveal possible correlations between demographic factors and certain conditions.

Methodology

Study Design: This study was a retrospective, hospital-based descriptive study designed to assess the prevalence and patterns of hyperpigmented skin disorders among patients attending a dermatology outpatient department (OPD).

Study Area: The study was conducted in the Department of Skin & VD, Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India.

Study Duration: The duration of the study was 8 months from July 2025 to February 2026.

Study Participants

Inclusion Criteria:

- Patients of all age groups and both genders attending the dermatology OPD during the study period.
- Patients presenting with complaints of hyperpigmentation.
- Patients diagnosed clinically with hyperpigmented skin disorders.
- Patients with complete and available medical records.

Exclusion Criteria:

- Patients without complaints of hyperpigmentation, even if diagnosed incidentally.
- Patients with incomplete or missing clinical records.
- Patients with doubtful or unconfirmed diagnoses.
- Follow-up cases where initial diagnosis data were not available.

Sample Size: A total of 90 patients fulfilling the inclusion criteria were included in the study.

Procedure: This retrospective study involved the systematic review and analysis of medical records of patients who attended the dermatology outpatient department during the defined study period. Data were collected from OPD registers and patient case files maintained in the Department of Skin & VD at

Sri Krishna Medical College and Hospital, Muzaffarpur. Only those patients who presented with primary complaints of hyperpigmentation were considered eligible for inclusion. The demographic details such as age and gender were recorded along with clinical information including type, distribution, and duration of hyperpigmented lesions. Diagnoses were primarily based on clinical evaluation documented by dermatologists, and where available, supportive investigations were also noted.

All identified cases were categorized into different types of hyperpigmented disorders such as melasma, post-inflammatory hyperpigmentation, lichen planus pigmentosus, freckles, and other related conditions based on standard dermatological classification. Care was taken to avoid duplication of records, and each patient was included only once in the dataset. Patients who had hyperpigmentation but did not report it as a primary complaint were excluded to maintain the study focus. The collected data were then organized systematically in a structured data collection sheet for further analysis. Confidentiality of patient information was strictly maintained throughout the study process.

Statistical Analysis: The collected data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social

Sciences (SPSS) version 27.0. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the data. The prevalence of different hyperpigmented skin disorders was calculated, and their distribution according to age and gender was analyzed. Results were presented in the form of tables and charts wherever appropriate.

Result

Table 1 shows the distribution of patients according to age group among a total of 90 cases. The highest proportion of patients belonged to the 21–30 years age group, accounting for 22 cases (24.44%), indicating that young adults formed the largest segment of the study population. This was followed by the 31–40 years age group with 20 cases (22.22%), and the 41–50 years group with 16 cases (17.78%). The age groups ≤ 20 years and 51–60 years each contributed 12 cases (13.33%), showing a moderate representation. The least number of patients were observed in the >60 years age group, comprising 8 cases (8.89%). Overall, the findings suggest that the majority of patients were concentrated in the younger and middle-aged groups, particularly between 21 and 40 years.

Age Group (Years)	Number of Cases	Percentage (%)
≤ 20	12	13.33
21–30	22	24.44
31–40	20	22.22
41–50	16	17.78
51–60	12	13.33
>60	8	8.89
Total	90	100

Table 2 shows the distribution of patients according to gender among a total of 90 cases. The findings indicate that females constituted the majority of the study population, with 52 cases accounting for

57.78%, whereas males comprised 38 cases, representing 42.22%. This demonstrates a higher prevalence of the condition among female patients compared to male patients in the present study.

Gender	Number of Cases	Percentage (%)
Male	38	42.22
Female	52	57.78
Total	90	100

Table 3 shows the distribution of types of hyperpigmented skin disorders among the study population (n = 90). Melasma was the most common condition, accounting for 26 cases (28.89%), indicating its high prevalence in the dermatology OPD. This was followed by post-inflammatory hyperpigmentation, observed in 22 cases (24.44%), reflecting its frequent occurrence secondary to various inflammatory skin conditions. Lichen planus pigmentosus constituted

14 cases (15.56%), representing a moderately common disorder. Freckles (ephelides) were noted in 10 cases (11.11%), while acanthosis nigricans and other miscellaneous conditions each accounted for 9 cases (10%). Overall, the findings suggest that melasma and post-inflammatory hyperpigmentation together form the major proportion of hyperpigmented disorders in the studied population.

Type of Disorder	Number of Cases	Percentage (%)
Melasma	26	28.89
Post-inflammatory hyperpigmentation	22	24.44
Lichen planus pigmentosus	14	15.56
Freckles (Ephelides)	10	11.11
Acanthosis nigricans	9	10
Others	9	10
Total	90	100

Table 4 shows the distribution of hyperpigmentation according to the site of involvement among 90 patients. The face was the most commonly affected site, accounting for 40 cases (44.44%), indicating a high predilection of hyperpigmented disorders for facial involvement, possibly due to greater sun exposure. This was followed by the neck with 14 cases (15.56%), and the upper limbs with 12 cases

(13.33%). Lower limbs were involved in 10 patients (11.11%), while the trunk accounted for 8 cases (8.89%). A smaller proportion of patients, 6 cases (6.67%), presented with hyperpigmentation at multiple sites. Overall, the findings suggest that exposed areas, particularly the face and neck, are more frequently affected compared to relatively covered regions.

Site of Involvement	Number of Cases	Percentage (%)
Face	40	44.44
Neck	14	15.56
Upper limbs	12	13.33
Lower limbs	10	11.11
Trunk	8	8.89
Multiple sites	6	6.67
Total	90	100

Table 5 shows the distribution of cases according to the duration of lesions among a total of 90 patients. The highest proportion of cases was observed in patients with a lesion duration of less than 6 months, accounting for 28 cases (31.11%), indicating that a significant number of patients sought medical attention in the early phase of the disease. This was followed by cases with a duration of 6 months to 1 year,

comprising 24 patients (26.67%). Patients with a lesion duration of 1 to 3 years constituted 20 cases (22.22%), while the lowest proportion was seen in those with lesions persisting for more than 3 years, accounting for 18 cases (20%). Overall, the findings suggest a gradual decline in the number of cases with increasing duration of lesions.

Duration of Lesions	Number of Cases	Percentage (%)
< 6 months	28	31.11
6 months – 1 year	24	26.67
1 – 3 years	20	22.22
> 3 years	18	20
Total	90	100

Discussion

The findings of the present study show strong agreement with previous studies which examined hyperpigmented skin disorders but demonstrate different results because of regional and demographic variations. The current study found that a significant number of dermatology OPD patients showed hyperpigmentation which confirms previous research that shows Indian populations have higher rates of pigmentary disorders than hypopigmented conditions (Dogra & Sarangal, 2014) [8]. The results

show young and middle-aged people between the ages of 21 and 40 most frequently visited healthcare facilities because they were concerned about their appearance and because they worked outside in the sun. The previous studies did not provide specific age distribution data yet the researchers found that young adults showed higher rates of prevalence because of their increased social and aesthetic awareness (Hourblin et al., 2014) [9].

The present research shows a bias toward females which matches existing findings. Studies have

consistently shown a higher frequency of pigmentary disorders among females, particularly melasma, due to hormonal influences, pregnancy, and use of cosmetics (Sonthalia S 2015) [10]. The study found that females made up over 50 percent of the cases while other Indian studies reported female proportions between 55 percent and 70 percent which demonstrated how cosmetic dermatological conditions create gender disparities in healthcare usage. The same pattern exists because endocrine factors and behavioral patterns influence pigmentation disorders across every culture.

The most prevalent disorder which we studied in our research proved to be melasma because previous studies showed that melasma accounted for 20 to 30 percent of all hyperpigmented cases (Hourblin et al., 2014). The study results showed a minor increase in melasma cases because people who studied our research area had higher chances of being exposed to ultraviolet radiation which causes melasma and better medical awareness which led them to seek treatment sooner. The research established that sunlight and hormonal factors function as causative agents because they lead to our patients developing facial skin problems (Sonthalia S 2015). The second most prevalent condition in our research study post-inflammatory hyperpigmentation showed results which matched previous studies because they found that PIH appeared in 10 to 15 percent of cases (Davis & Callender, 2010) [11]. The study results showed values above these established limits because the research population experienced higher rates of inflammatory skin conditions which included acne and eczema together with their poor medical treatment methods.

Our study found a higher prevalence of lichen planus pigmentosus (LPP) when compared to previous research which showed a 4.1% prevalence rate. The difference in results can be attributed to regional customs which include mustard and amla oil as potential risk factors for the condition. Our research showed a lower rate of freckles (ephelides) in patients compared to a study conducted in Kashmir which found a 3.5% prevalence rate (Yaseen & Hassan, 2013) [13]. The different skin phototypes involved in this study led to a contrast because fair-skinned individuals develop freckles more often than those with darker skin which made up most of our research group.

“The study showed only a small percentage of participants who developed periocular melanosis which differed from the 30% prevalence reported by Sheth et al. (2014) [14]. This discrepancy exists because their research used different methods to examine patients who had the condition while our study tested only patients who arrived with specific medical concerns. Acanthosis nigricans (AN) occurred in our study at a lower rate than previous studies which found that AN links to insulin resistance and obesity

(Sadeghian et al., 2009) [15]. The study results showed a lower proportion of metabolic disorders yet this finding still holds clinical importance because it links to metabolic disorders.

The research showed that post-inflammatory hyperpigmentation and pigmentary changes from infections like pityriasis versicolor matched findings from previous studies. Research indicates that people with darker skin types experience more severe and longer lasting changes in their skin color (Aljabre et al., 2001) [16]. The results demonstrate that our findings match this observation because most patients developed permanent skin discoloration. The study showed that fixed drug eruption and exogenous ochronosis appeared in smaller percentages which confirmed previous findings about how medications and topical agents get used without restrictions (Zawar & Mhaskar, 2004) [17].

The study found that facial sites had the highest distribution which matched previous research that found ultraviolet light exposure caused pigmentation disorders (Hourblin et al., 2014). The study results show that environmental factors caused more skin problems in exposed body parts than in areas that remained covered. The study found that most patients presented within six months of their condition which indicates that better public understanding and easier access to healthcare services had occurred. The study found that cases continued for more than one year because patients needed long-term treatment which reflects both chronic conditions and previous poor treatment methods that Davis and Callender observed in their study on PIH and melasma (Davis & Callender, 2010).

The current research supports previous studies but demonstrates different regional patterns for hyperpigmented disorders and their prevalence. The studies show consistent findings about female predominance and facial involvement in both melasma and PIH, while environmental and genetic factors together with cultural influences produce different results for LPP and freckles. Local epidemiological factors need to be considered when diagnosing and treating hyperpigmented skin disorders because they have been shown to impact these conditions”.

Conclusion

The present study highlights that hyperpigmented skin disorders constitute a significant proportion of dermatological conditions in the OPD setting, with a higher prevalence among young and middle-aged individuals and a notable female predominance. Melasma and post-inflammatory hyperpigmentation emerged as the most common conditions, emphasizing the role of hormonal influences, ultraviolet exposure, and inflammatory dermatoses in their pathogenesis. The predominance of lesions on exposed areas, particularly the face, further supports the contribution of environmental factors. Additionally, the

majority of patients presenting within a shorter duration reflects increasing awareness and healthcare accessibility. Overall, the study underscores the need for early diagnosis, preventive strategies, and targeted management approaches, considering the clinical and psychosocial impact of hyperpigmented disorders in the affected population.

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