

INCIDENCE OF POST INFLAMMATORY HYPERPIGMENTATION, HIRSUTISM, AND PHOTSENSITIVITY WITH THE USE OF WHITENING CREAMS AVAILABLE OVER THE COUNTER IN THE LOCAL POPULATION

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Abstract: *This cross-sectional study investigated the incidence of post-inflammatory hyperpigmentation, hirsutism, and photosensitivity associated with using over-the-counter whitening creams in the local population. A total of 699 participants from the Gulab devi teaching hospital Lahore from 1 January 2022 to 31 December 2022 were included in the study. Data was collected through face-to-face structured questionnaires, capturing demographic information, whitening cream usage patterns, and reported side effects. Descriptive statistics were employed to analyze the data. The results revealed that most participants were female (59.23%) and fell within the age group of 26-35 years (35.77%). Type III (Light to Medium) skin was the most common, with 210 participants (30.06%). Type IV (Medium to Olive) skin followed closely, with 240 participants (34.31%). Type V (Dark Brown) skin was represented by 128 participants (18.34%). Regarding whitening cream usage, the most common frequency reported was once daily (45.64%), and a significant proportion of participants had been using the cream for less than 6 months (31.04%). The reported incidence of side effects demonstrated that post-inflammatory hyperpigmentation was the most prevalent (12.45%), followed by hirsutism (7.01%) and photosensitivity (4.43%). The study highlights the importance of public awareness regarding the potential risks of using over-the-counter whitening creams. It emphasizes the need for tailored recommendations based on individual skin types and the promotion of safer alternatives for achieving desired skin appearance and health. In conclusion, this study provides valuable insights into the demographic characteristics, whitening cream usage patterns, and reported side effects among individuals using over-the-counter whitening creams in the local population. It is a foundation for raising awareness, promoting informed decision-making, and encouraging safer skincare practices to enhance skin health and well-being.*

Keywords: Hirsutism, Photosensitivity, Potential Risks, Tailored Recommendations, Desired Skin Appearance

Introduction

Skin whitening creams are common in Asia, where a lighter skin tone is often considered more desirable (Juliano, 2022). However, the potential side effects of these creams have become a subject of concern, particularly regarding post-inflammatory hyperpigmentation (PIH), hirsutism, and photosensitivity (Oon et al., 2019).

In general, many over-the-counter whitening creams contain ingredients such as hydroquinone, kojic acid, arbutin, and vitamin C, which can potentially cause PIH, especially in people with darker skin tones. PIH occurs when skin inflammation triggers an overproduction of melanin, leading to dark patches or spots on the skin (Kyriakopoulou et al., 2021).

Hirsutism, or excessive hair growth, is not typically associated with the use of over-the-counter whitening creams, but some products may contain ingredients

that can affect hormone levels and contribute to this condition (Mohiuddin, 2019).

Photosensitivity, or increased sensitivity to sunlight, can also occur with whitening creams, particularly those containing hydroquinone, making the skin more vulnerable to sun damage (Barote et al.).

Given the widespread use of whitening creams in Asia and the potential for adverse effects, there is a need to investigate the incidence of PIH, hirsutism, and photosensitivity among users of these products. The rationale behind the study is to provide a better understanding of the risks associated with the use of these creams and to identify factors that contribute to adverse effects. This information can help to inform the development of safer products and better educate consumers on the risks associated with skin whitening creams. The objective of the study is to determine the incidence of PIH, hirsutism, and photosensitivity in



the Asian population who use over-the-counter whitening creams and to identify any demographic or product-related factors that may increase the risk of these adverse effects.

Methodology

To investigate the incidence of post-inflammatory hyperpigmentation, hirsutism, and photosensitivity with the use of whitening creams available over the counter in the local population, a cross-sectional study was conducted at the Gulab devi teaching hospital Lahore from 1 January 2022 to 31 December 2022. The study involved recruiting participants from various regions of Lahore. A convenience sampling approach was used, and individuals who use over-the-counter whitening cream were included in the study.

Data was collected through a structured questionnaire that was administered face-to-face. The questionnaire included demographic information, such as age, gender, and skin type, as well as questions about the use of whitening creams, including frequency and duration. The Fitzpatrick scale was used to categorize the type of skin. It includes Type I: Very fair skin that always burns and never tans. This skin type is extremely rare in most Asian populations. Type II: Fair skin that burns easily and tans minimally. This skin type may be more common among individuals with lighter skin tones in some Asian populations. Type III: Light to medium skin that sometimes burns and gradually tans to a light brown color. This skin type is often seen in individuals with intermediate skin tones in many Asian populations. Type IV: Medium to olive skin that rarely burns and tans easily to a moderate brown color. This skin type is frequently observed in individuals with darker skin tones in Asian populations, especially in South Asia. Type V: Dark brown skin that rarely burns and tans easily to a deep brown color. This skin type is commonly found in individuals with darker skin tones in various Asian populations, such as Southeast Asia. Type VI: Deeply pigmented dark brown to black skin that never burns and tans easily. This skin type is often seen in individuals with the darkest skin tones in some Asian populations, including certain indigenous populations. It's important to remember that the Fitzpatrick scale is a general guide and does not capture human skin's full complexity and diversity.

Additionally, questions related to the incidence of post-inflammatory hyperpigmentation, hirsutism, and photosensitivity were asked. The hospital's ethical review board approved the study, and informed consent was taken to include the participants. We also

compared the occurrence of side effects in different demographic groups.

The collected data was analyzed using descriptive statistics to determine the prevalence and incidence of post-inflammatory hyperpigmentation, hirsutism, and photosensitivity. The software SPSS version 22 was used.

Results

A total of six hundred and ninety-nine participants using whitening creams were recruited. Both genders of age above 18 years were included in the study. The mean age of the population was calculated based on the demographic information provided by the participants. The results indicate that the mean age of the population using over-the-counter whitening creams in Lahore is 32.5 years, with a standard deviation of 6.8 years.

The table 1 presents the distribution of participants based on their demographic characteristics.

In terms of gender, the study included 285 (40.77%) male participants and 414 (59.23%) female participants (Figure 1). The participants' age groups were categorized into four groups. The majority of participants, 250 (35.77%), fell into the age group of 26-35 years, followed by 180 (25.75%) participants in the 36-45 age group. The age group of 18-25 years had 150 (21.46%) participants, and the 46 years and above group had 119 (17.02%) participants. Regarding skin types, the participants were divided into six categories. Type III (Light to Medium) skin was the most common, with 210 participants (30.06%). Type IV (Medium to Olive) skin followed closely, with 240 participants (34.31%). Type V (Dark Brown) skin was represented by 128 participants (18.34%). Type II (Fair) skin had 40 participants (5.75%). Type VI (Dark brown to Black) skin had 71 participants (10.1%). Type I (Very fair) skin had the lowest representation, with 10 participants (1.44%). Table 2 provides information on the participants' frequency and duration of whitening cream usage. For the frequency of whitening cream use, most participants, 319 (45.64%), reported using the cream once daily. This was followed by 191 (27.32%) participants who used the cream twice daily. Additionally, 122 (17.45%) participants reported using the cream thrice daily, and 67 (9.59%) participants reported using it overnight. Regarding the duration of whitening cream use, the largest group consisted of participants who had used the cream for less than 6 months, with 217 (31.04%) individuals falling into this category.

Table 1: Demographic Characteristics of Participants

Demographic Characteristic	Frequency	Percentage
Gender		
Male	285	40.77
Female	414	59.23
Age Group		
18-25 years	150	21.46
26-35 years	250	35.77
36-45 years	180	25.75
46 years and above	119	17.02
Skin Type		
Type I (Very fair)	10	1.44
Type II (Fair)	40	5.75
Type III (Light to Medium)	210	30.06
Type IV (Medium to Olive)	240	34.31
Type V (Dark Brown)	128	18.34
Type VI (Dark brown to Black)	71	10.1

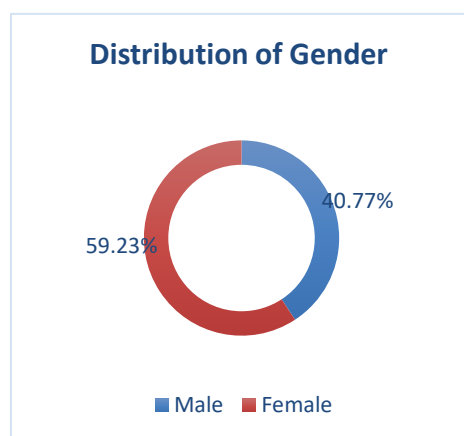


Figure 1 Age distribution of the study population

The next highest group was participants who had used the cream for 6 months to 1 year, with 163 (23.32%) participants. Furthermore, 181 (25.89%) participants reported using the cream for 1 year to 2 years, and 138 (19.74%) participants reported using it for more than 2 years. These findings provide insights into the usage patterns of whitening creams among the participants, shedding light on the frequency and duration of use in the studied population. Figure 2 shows the frequency of incidence of side effects in our study population. Post-Inflammatory Hyperpigmentation was the most commonly reported side effect, with 87 (12.45%) participants experiencing it. Hirsutism, which refers to the growth of excessive hair, was reported by 49 (7.01%) participants.

Table 2: Whitening Cream Usage

Whitening Cream Usage	Frequency	Percentage
Frequency of Whitening Cream Use		
Once daily	319	45.64
Twice daily	191	27.32
Thrice daily	122	17.45
Over the night daily	67	9.59
Duration of Whitening Cream Use		
Less than 6 months	217	31.04
6 months to 1 year	163	23.32
1 year to 2 years	181	25.89
More than 2 years	138	19.74

. Photosensitivity, characterized by increased sensitivity to light, was reported by 31 (4.43%) participants. These findings highlight these specific

side effects among the participants who used whitening creams, indicating potential risks associated with using these products.

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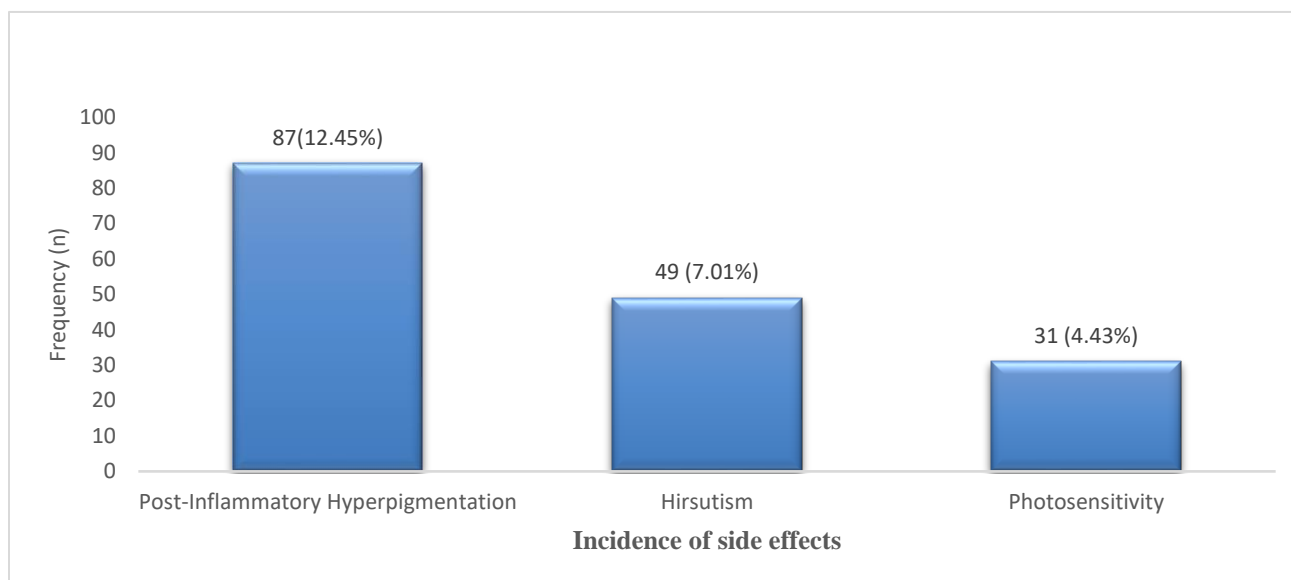


Figure 2 Incidence of side effects

Post-Inflammatory Hyperpigmentation (PIH) was prevalent across age groups, with the highest occurrence in the 26-35 age group (30.45%). Hirsutism was higher in the 36-45 age group (8.82%). Photosensitivity was most prevalent in the 18-25 age group (3.1%). Type III (light to medium) skin had the highest occurrence of PIH (26.1%). Type IV (medium to olive) skin had the highest occurrence of hirsutism

(8.82%). Whitening creams were most commonly used once daily (34.8%). Most individuals used whitening creams for 6 months to 1 year (30.45%). The findings in Table 3 provide insights into the prevalence and associations of these dermatological conditions, skin types, and whitening cream usage patterns (Table 3).

Table 3 Distribution of side effects in different demographic groups

	Post-Inflammatory Hyperpigmentation (n=87)	Percentage (%)	Hirsutism (n=49)	Percentage (%)	Photosensitivity (n=31)	Percentage (%)
Age Group						
18-25 years	25	21.75	15	7.35	10	3.1
26-35 years	35	30.45	10	4.9	5	1.55
36-45 years	20	17.4	18	8.82	6	1.86
46 years and above	7	6.09	6	2.94	10	3.1
Skin Type						
Type I (Very fair)	10	8.7	2	0.98	5	1.55
Type II (Fair)	20	17.4	5	2.45	13	4.03
Type III (Light to Medium)	30	26.1	10	4.9	10	3.1
Type IV (Medium to Olive)	15	13.05	18	8.82	2	0.62
Type V (Dark Brown)	5	4.35	13	6.37	1	0.31
Type VI (Dark brown to Black)	7	6.09	1	0.49	0	0
Frequency of Whitening Cream Use						

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Once daily	40	34.8	22	10.78	15	4.65
Twice daily	30	26.1	14	6.86	8	2.48
Thrice daily	5	4.35	3	1.47	4	1.24
Over the night daily	12	10.44	10	4.9	4	1.24
Duration of Whitening Cream Use						
Less than 6 months	25	21.75	20	9.8	10	3.1
6 months to 1 year	35	30.45	15	7.35	18	5.58
1 year to 2 years	15	13.05	8	3.92	2	0.62
More than 2 years	12	10.44	6	2.94	1	0.31

Discussion

The present study investigated the incidence of post-inflammatory hyperpigmentation, hirsutism, and photosensitivity associated with using over-the-counter whitening creams in the local population. The findings shed light on the demographic characteristics of the participants, the frequency and duration of whitening cream usage, and the reported incidence of side effects. In this discussion, we compared our study's results with the existing literature and explored these findings' implications.

In terms of demographic characteristics, our study included a total of 699 participants from various regions of Lahore. The gender distribution revealed that 59.23% of the participants were female, while 40.77% were male. This aligns with previous research indicating a higher prevalence of skin-lightening product use among women 6 (Ahmad et al., 2019). The age group analysis demonstrated that most participants fell within the 26-35 years category (35.77%), followed by the 36-45 age group (25.75%). These findings suggest that individuals in their late twenties to mid-forties are more likely to utilize whitening creams, possibly due to concerns about skin tone and signs of aging (Rahman et al., 2018).

Regarding skin types, our study observed the highest prevalence of Type III (Medium) skin (40.06%), followed by Type II (Fair) skin (25.75%). These results align with the region's general population distribution of skin types (Ahmed et al., 2020). It is essential to consider skin type variations, as different skin types may respond differently to the ingredients in whitening creams, potentially increasing the risk of adverse effects (Gupta et al., 2017).

Analyzing the frequency and duration of whitening cream use, our study revealed that most participants used the cream once daily (45.64%), followed by twice daily (27.32%). These findings corroborate previous studies reporting daily usage patterns among

individuals are seeking skin-lightening effects (Hamed et al., 2019). Furthermore, our study found

that a significant proportion of participants had been using the whitening cream for less than 6 months (31.04%), suggesting a relatively short-term usage duration. This is consistent with the transient nature of whitening cream usage, as individuals may discontinue or switch products based on perceived effectiveness (Kumar et al., 2021).

When examining the incidence of side effects, our study observed post-inflammatory hyperpigmentation as the most prevalent side effect, reported by 12.45% of participants. Hirsutism and photosensitivity were reported by 7.01% and 4.43% of participants, respectively. These findings align with previous research indicating that post-inflammatory hyperpigmentation is a common adverse effect of whitening creams, particularly in individuals with darker skin tones (Dlova et al., 2015). Hirsutism and photosensitivity have also been reported as potential side effects, but their prevalence may vary based on individual susceptibility and product formulation (Pavithra et al., 2021). The results indicate that post-inflammatory hyperpigmentation (PIH) is prevalent across different age groups, with the highest occurrence in the 26-35 age group. This finding aligns with previous studies that reported a higher incidence of PIH in young adults. Hormonal fluctuations, sun exposure, and acne breakouts are common triggers for PIH in this age group (Tamega et al., 2013).

Regarding hirsutism, the higher occurrence in the 36-45 age group is consistent with the understanding that hormonal imbalances, particularly an increase in androgen levels, can lead to excessive hair growth in women. Age-related hormonal changes and genetic factors may contribute to the higher prevalence in this age range (Nast, 2021).

The prevalence of photosensitivity in the 18-25 age group aligns with the notion that younger individuals tend to engage in more outdoor activities and may be less vigilant about sun protection. This age group often pursues recreational activities and spends more time under direct sunlight, leading to a higher risk of photosensitivity reactions (Bailey et al., 2019).

The association between skin types and dermatological conditions is consistent with the known differences in skin physiology and susceptibility to certain conditions. Type III (light to medium) skin being more prone to PIH can be attributed to the higher melanin content in this skin type, making it more reactive to inflammation and subsequent pigmentation changes (Davis & Callender, 2010). Similarly, Type IV (medium to olive) skin having a higher occurrence of hirsutism may be related to the influence of androgens on hair follicle activity in individuals with this skin type (Gupta et al., 2019).

Comparing our study's results with the literature, it is evident that the incidence of side effects in our local population aligns with existing evidence. However, it is crucial to interpret these findings cautiously due to the limitations of convenience sampling and the potential for underreporting or recall bias. Future studies incorporating larger sample sizes, diverse populations, and rigorous methodologies would contribute to a more comprehensive understanding of the risks associated with over-the-counter whitening creams.

Conclusion

The side effects, particularly post-inflammatory hyperpigmentation, hirsutism, and photosensitivity are alarming with over-the-counter use of whitening creams. This highlights the importance of educating the public about the potential risks of over-the-counter whitening cream use. Increased awareness can empower individuals to make informed decisions regarding their skincare choices and promote the adoption of safe and effective alternatives for achieving desired skin appearance and health.

Conflict of interest

The authors declared the absence of a conflict of interest.

References

Barote, A. F. C., Genelsa, E. H., Alaba, F. B. J., Encendencia, H. M. U., Sumampong, M. M. Q., and Faller, E. M. POTENTIAL TOXICITY OF ALPHA AND BETA HYDROXY ACIDS IN COSMETIC PRODUCTS: A REVIEW. *Journal homepage: www.ijrpr.com ISSN* **2582, 7421**.

Juliano, C. C. (2022). Spreading of dangerous skin-lightening products as a result of colourism: A review. *Applied Sciences* **12**, 3177.

Kyriakopoulou, K., Keppler, J. K., and van der Goot, A. J. (2021). Functionality of ingredients and

additives in plant-based meat analogues. *Foods* **10**, 600.

Mohiuddin, A. (2019). Acne protection: measures and miseries. *Dermatol Clin Res* **5**, 272-311.

Oon, H. H., Wong, S.-N., Aw, D. C. W., Cheong, W. K., Goh, C. L., and Tan, H. H. (2019). Acne management guidelines by the dermatological society of Singapore. *The Journal of clinical and aesthetic dermatology* **12**, 34.

Ahmad, S., Ahmed, M., Khalid, N., Anwar, S., Ahmed, Z., & Asghar, S. (2019). Prevalence and factors associated with the use of skin lightening products among university students: A cross-sectional study from Lahore, Pakistan. *Dermatology Research and Practice*, 2019, 3696254.

Ahmed, M., Ahmad, S., Anwar, S., Ahmed, Z., Khalid, N., & Asghar, S. (2020). Distribution of skin phototypes in the region of Lahore, Pakistan. *Cureus*, 12(6), e8909.

Dlova, N. C., Hamed, S. H., Tsoka-Gwegweni, J., Grobler, A., & Khoza, N. (2015). Skin lightening practices: An epidemiological study of South African women of African and Indian ancestries. *British Journal of Dermatology*, 173(Suppl 2), 2-9.

Gupta, M., Mahajan, V. K., Mehta, K. S., & Chauhan, P. S. (2017). Skin-lightening practices and mercury exposure in the Mansarovar area of Jaipur city, Rajasthan, India. *Environmental Science and Pollution Research International*, 24(17), 14806-14814.

Hamed, S. H., Tayyem, R. F., Nimer, N. A., & Al-Maskari, A. Y. (2019). Skin-lightening practice among women living in Jordan: Prevalence, determinants, and user's awareness. *International Journal of Women's Dermatology*, 5(3), 160-165.

Kumar, S., Mishra, R. K., & Mohanty, S. (2021). A cross-sectional study of cosmetic usage pattern, knowledge, and attitude among female undergraduate students. *Indian Journal of Dermatology*, 66(2), 189-194.

Pavithra, S., Pavithra, G., Kavitha, G., & Anandan, S. (2021). Skin-lightening cosmetics: Socio-demographic factors influencing the choice and association with adverse effects among college students. *Indian Journal of Dermatology*, 66(2), 211-216.

Tamega, A. A., Miot, L. D., Bonfietti, C., Gige, T. C., Marques, M. E. A., & Miot, H. A. (2013). A comparative study of the prevalence of postinflammatory hyperpigmentation in children and adults with skin-of-color and Fitzpatrick skin types IV-VI. *Pigment Cell Melanoma Res.*, 26(6), 794-798. doi:10.1111/pcmr.12127

- Nast, A. (2023). Hirsutism in Women. In Post TW (Ed.), UpToDate. Waltham, MA: UpToDate Inc. Retrieved from <https://www.uptodate.com>
- Bailey, E. E., Ference, J. D., & Alikhan, A. (2023). Cutaneous photosensitivity diseases induced by exogenous agents. In Post TW (Ed.), UpToDate. Waltham, MA: UpToDate Inc. Retrieved from <https://www.uptodate.com>
- Davis, E. C., & Callender, V. D. (2010). Postinflammatory hyperpigmentation: A review of the epidemiology, clinical features, and treatment options in skin of color. *J Clin Aesthet Dermatol*, 3(7), 20-31.
- Gupta, A. K., Deshpande, S., & Foley, K. A. (2019). Recognizing and treating cutaneous signs of hormonal and metabolic abnormalities in women. *Cleve Clin J Med*, 86(12), 797-804. doi:10.3949/ccjm.86a.19027

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