

Prevalence and Pattern of Self-Medication for Melasma among University Students: A Cross-Sectional Survey

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ARTICLE INFO

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Article History

Received: 28-07-2026
Revised: 16-09-2026
Accepted: 23-09-2026
Published: 30-09-2026

How to Cite

Ijaz S, Yousaf S, Ahmad A, Zia F, Akram I, Arshad A, et al. Prevalence and Pattern of Self-Medication for Melasma among University Students: A Cross-Sectional Survey. Pak J Clin Res. 2026;3(9):19-24. doi:10.65761/pjcr.2026.317

DOI: <https://doi.org/10.65761/pjcr.2026.317>

ABSTRACT

Background: Melasma is common in young women with darker skin, and the crowded market of whitening creams, steroids and herbal products makes it a natural target for self-medication. How students manage the condition, and how safely, is poorly documented in Pakistan. We measured the prevalence and patterns of self-medication for melasma, and the attitudes surrounding it, among university students.

Methods: In a cross-sectional survey across South Punjab (July-August 2025), 438 students completed a self-administered questionnaire covering demographics, melasma awareness and experience, treatment-seeking, products used, side effects, and attitudes. We analysed responses in SPSS using descriptive statistics.

Results: Most respondents were women (64.2%), aged 18-23 (85.6%), and enrolled in health-sciences faculties (89.0%). Awareness of melasma was high (82.6%), most often acquired from the internet or social media (34.0%), yet only 24.7% had ever been formally diagnosed. Among those who acted, fewer than half sought help (45.0%); dermatologists were the most common first contact (59.6%), but pharmacies supplied most self-medication (54.8%), and about 30% used prescription-type products without a prescription. Reported agents included vitamins (25.5%), hydroquinone (14.1%), organic acids (12.9%) and retinoids (9.2%); roughly half tried home remedies. Self-medication caused side effects in 22.7%. Despite this, 74.8% considered dermatologist consultation necessary and 71.9% backed awareness campaigns.

Conclusion: Awareness of melasma was high but rarely translated into supervised care. Self-management was pharmacy-driven and frequently unsupervised, with a meaningful side-effect burden. This gap between knowledge and safe practice is one community pharmacists are well placed to close.

Keywords: Melasma; Self-medication; University students; Skin-lightening products; Community pharmacy

INTRODUCTION

Melasma is a chronic, acquired, and often therapeutically challenging hyperpigmentation disorder. It is characterized by irregular, symmetrical brown to gray-brown macules that predominantly affect sun-exposed areas of the face, most notably the cheeks, forehead, upper lip, and chin.¹ Although the condition carries no systemic morbidity, its psychological and psychosocial burden is disproportionately significant, frequently leading to diminished self-esteem, social withdrawal, and measurable deterioration in health-related quality of life.² Melasma pathogenesis is multifactorial, involving UV exposure, hormonal fluctuations, genetic predisposition, and certain pharmacological agents.³ Its prevalence shows a marked predilection for individuals with Fitzpatrick skin types III through V, making South Asian populations, including those of Pakistan, particularly affected.⁴

The global burden of melasma is substantial, with prevalence estimates varying widely across geographic regions and demographic groups. In South Asia, the condition is common in dermatological practice, yet community-level epidemiological data, particularly from Pakistan, remain scarce.⁵ University students constitute a demographically distinct and understudied

population in this context. Their age coincides with peak hormonal activity, their lifestyle includes prolonged outdoor exposure, and their psychological investment in physical appearance renders them especially vulnerable to the psychosocial sequelae of visible pigmentary disorders. These factors create fertile ground for unsupervised therapeutic decision-making, most prominently self-medication.^{6,7} Self-medication, broadly defined as the procurement and use of pharmaceutical agents without professional medical consultation or a valid prescription, is a pervasive and growing public health concern across low and middle-income countries, including Pakistan.⁸ In dermatological conditions such as melasma, self-medication is particularly hazardous given the widespread availability of over-the-counter depigmenting preparations. Many contain potent agents, including hydroquinone, corticosteroids, mercury-based compounds, and high-concentration retinoids.⁹ Indiscriminate and prolonged use of such formulations carries well-documented risks, including exogenous ochronosis, steroid-induced rosacea, cutaneous atrophy, paradoxical post-inflammatory hyperpigmentation, and systemic toxicity from mercury-containing cosmeceuticals. Despite these established hazards, regulatory enforcement of



cosmetic and pharmaceutical products in Pakistan remains inconsistent, facilitating unhindered consumer access to potentially harmful skin-lightening agents.^{10, 11} Punjab, home to Pakistan's largest urban university population, offers a particularly relevant setting for investigating self-medication behaviors related to melasma. Sociocultural pressures surrounding a fair complexion are deeply embedded in South Asian aesthetic norms and are amplified through digital media platforms. These pressures have exerted considerable influence over young individuals' therapeutic choices, often circumventing formal medical guidance.^{12, 13}

Despite the convergence of these risk factors, no dedicated cross-sectional study has comprehensively characterized the prevalence, patterns, and determinants of self-medication for melasma among university students in Punjab, Pakistan. Addressing this evidence gap is not only clinically relevant but also has significant implications for public health policy, pharmaceutical regulation, and dermatological education at the institutional level.

Objective

The present study was therefore designed to quantify the prevalence of self-medication for melasma in this population, delineate the categories and sources of agents used, and identify the sociodemographic and behavioral correlates underlying these practices.

METHODOLOGY

Design, setting and participants

This was a cross-sectional survey conducted across south Punjab between July and August 2025. The study enrolled 438 university students of both sexes, recruited through random sampling and formally invited to participate.

A self-designed, self-administered questionnaire was distributed to participants. It covered demographic details; awareness and experience of melasma; treatment-seeking behavior and self-medication practices; the specific products, medicines and home remedies used; side effects; and attitudes and knowledge about safety, dermatological consultation and skin-lightening products. Completion rates were high across the sampled areas.

Responses were entered into SPSS. Categorical variables are reported as frequencies and percentages, and continuous variables as means with standard deviations. The protocol specified multivariate binary logistic regression to relate predictors to self-medication; however, the source data include no model output, so this article reports descriptive findings only (see Items to verify).

The Research Ethics Committee of Quaid-e-Azam College of Pharmacy, Sahiwal, approved the study (Letter No. QACP/25/340), and participation was based on an informed invitation.

RESULTS

Sample characteristics

The cohort was young, female-dominated, and academically homogeneous: 64.2% were women, 85.6% were aged 18-23, and 89.0% were enrolled in medical or health-sciences faculties, with undergraduates the largest group (76.0%) (Figure 1, Table 1). This profile shapes how the findings should be interpreted, a point discussed below.

Figure 1. Sample characteristics (N = 438): (A) gender, (B) age, (C) level of study, (D) faculty. Percentages are reported as in the

source; see Items to verify regarding the level-of-study and gender tables.

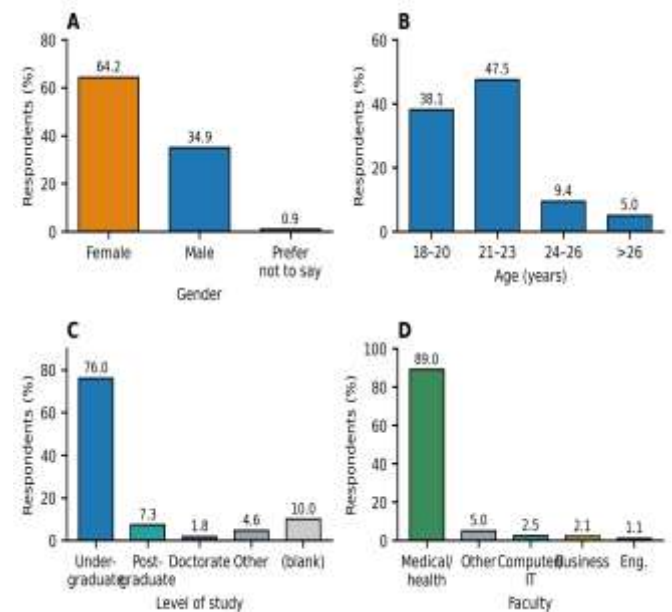


Table 1. Demographic profile of respondents (N = 438).

Characteristic	Category	%
Gender	Female	64.2
	Male	34.9
Age (years)	18–20	38.1
	21–23	47.5
	24–26	9.4
	>26	5
Level of study	Undergraduate	76
	Postgraduate	7.3
Faculty	Medical/health sciences	89
	Computer/IT	2.5
	Business/Economics	2.1
	Engineering/Technology	1.1
	Others	5

The gap between awareness and supervised care

The pattern that underlies every other finding is a wide gap between knowing about melasma and receiving proper treatment. Awareness was high, with 82.6% of participants having heard of the condition and half (50.7%) regarding it as a serious skin problem. Yet only 24.7% had ever received a formal diagnosis, and fewer than half (45.0%) had sought any help at all (Figure 2). Awareness itself came largely from informal channels: the internet and social media (34.0%) and friends and family (31.5%) together accounted for nearly two-thirds, compared with just 17.9% from healthcare professionals (Figure 3). In the present study, knowledge of the disease was widespread, but clinical contact was inadequate.

Figure 2. Awareness and experience of melasma (% affirmative of 438). Awareness was high (82.6%), but formal diagnosis

(24.7%) and treatment-seeking (45.0%) lagged well behind.

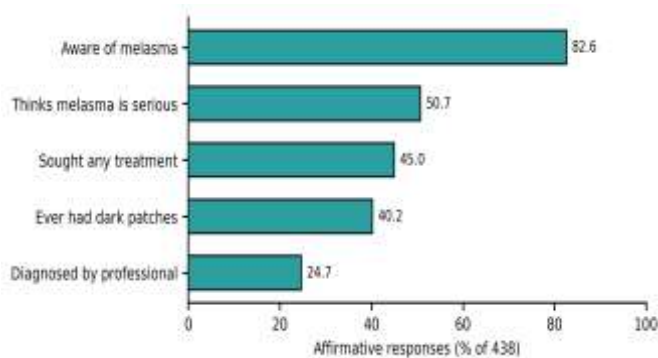
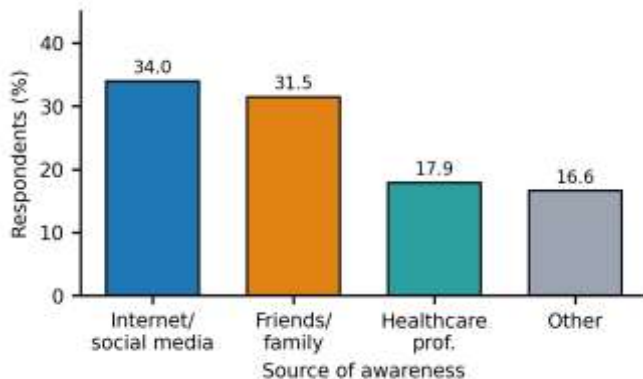


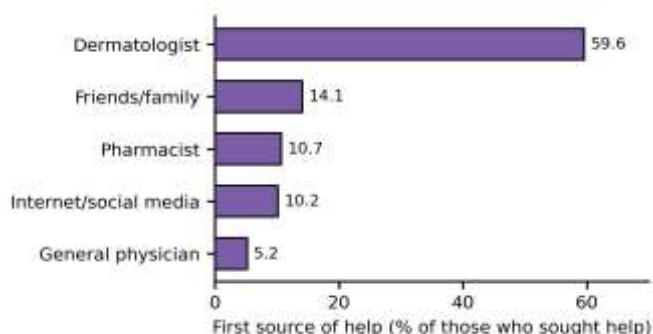
Figure 3. Where respondents first heard about melasma. Informal channels (internet/social media and friends/family) dominated over healthcare professionals.



Treatment-seeking is dermatologist-led but pharmacy-supplied

Among those who responded, the first point of contact was usually appropriate, i.e. dermatologists (59.6%), friends and family (14.1%), far outranking pharmacists (10.7%), the internet (10.2%) and general physicians (5.2%) (Figure 4). However, the supply of self-medication told a different story: pharmacies provided the majority of self-purchased products (54.8%), with beauty stores (7.2%), online stores (6.9%) and friends or family (5.5%) trailing far behind. About 30% of respondents reported using prescription-type products without a prescription. While the entry point into care was often a specialist, the products people used on their own overwhelmingly came from a pharmacy counter.

Figure 4. First source of help among respondents who sought treatment. Dermatologists led (59.6%), with pharmacists and informal sources well behind.

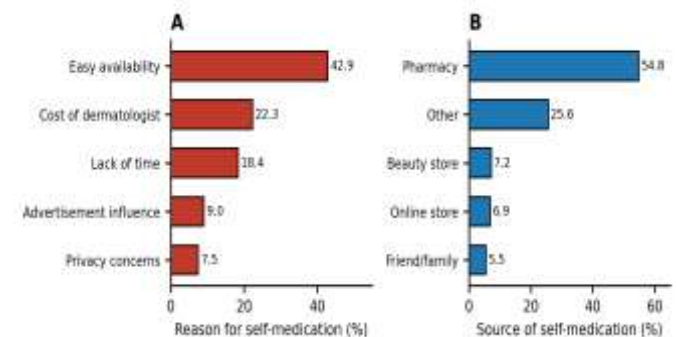


Why students self-medicate, and what it costs them

Figure 5A shows the reasons for self-medication, with 42.9% of

respondents citing easy availability, while the cost of a dermatologist visit, lack of time, advertising influence and privacy concerns accounted for 22.3%, 18.4%, 9.0% and 7.5% respectively. Pharmacies were again the dominant source (54.8%) (Figure 5B). The practice was not without harm: 22.7% reported side effects from self-medication, most often skin irritation (22.9%), redness (18.2%) and allergic reactions (12.2%), and a further 25.1% were unsure whether they had been harmed. Home remedies caused side effects in about a fifth of users (19.8%), chiefly contact dermatitis and photosensitivity. Reassuringly, most respondents (58.7%) said they always read product instructions before use.

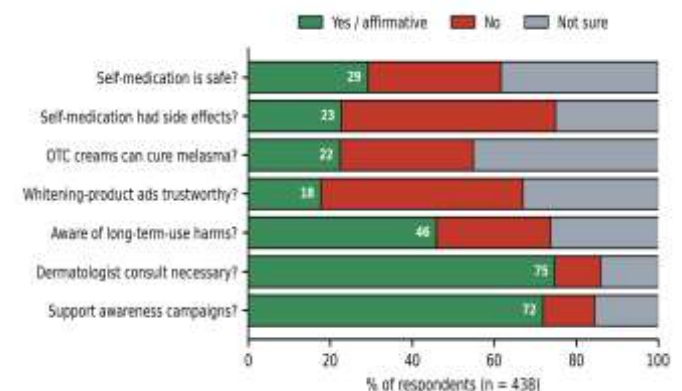
Figure 5. Drivers and supply of self-medication. (A) Reasons for self-medication (B) Sources for self-medication



Attitudes and knowledge about the self-medication

In the present study, attitudes were ambivalent. Only 29.2% thought self-medication was safe, with the rest split between “no” (32.5%) and “not sure” (38.2%), and just 22.4% believed over-the-counter creams could cure melasma outright. Most distrusted whitening-product advertising (49.3% “no”), yet social media still influenced product choice for the majority (70.4% “strongly” or “somewhat”). Awareness of the harms of long-term unsupervised product use was partial (45.9% aware). Against that uncertainty, the appetite for better guidance was clear: 74.8% considered dermatologist consultation necessary, and 71.9% supported awareness campaigns about the dangers of self-medication (Figure 6).

Figure 6. Attitudes and knowledge about the self-medication

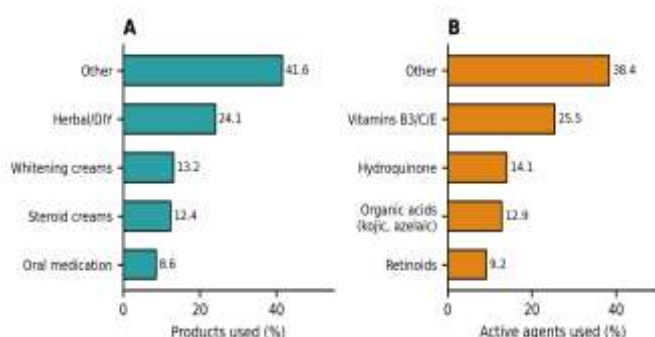


Products, active agents and home remedies

The products used spanned the full spectrum from cosmetic to pharmacological. Herbal and do-it-yourself remedies were the most commonly named category (24.1%), followed by whitening creams (13.2%) and steroid creams (12.4%), with oral medication least common (8.6%) (Figure 7A). Among named active agents, vitamins (B3, C, E) were most frequently cited (25.5%), ahead of hydroquinone (14.1%), organic acids such as

kojic and azelaic acid (12.9%), and retinoids (9.2%) (Figure 7B). Roughly half the sample (49.5%) had tried home remedies, and just over half of those (51.3%) judged them effective; aloe vera (30.5%) and turmeric (24.5%) were the ingredients most often credited with helping.

Figure 7. Self-treatment choices. (A) Types of products used; herbal/DIY remedies led. (B) Named active agents; vitamins, hydroquinone and organic acids predominated.



DISCUSSION

This cross-sectional study reveals a deeply entrenched paradox at the heart of melasma management among university students in Punjab, Pakistan. Awareness of melasma is widespread, yet structured clinical engagement remains conspicuously limited. This disconnect is not merely a matter of individual decision-making but reflects broader systemic deficiencies in dermatological health literacy.¹⁴ These include limited access to specialist care and the unchecked influence of digital platforms on awareness and knowledge among young adults.¹⁵

The dominance of informal awareness channels (social media and peer networks), which together account for nearly two-thirds of first exposure to information about melasma, warrants particular analytical attention. Healthcare professionals contributed very little to awareness (only 17.9% of cases). This proportion is strikingly low within a cohort composed predominantly of medical and health sciences students (89.0%). This observation suggests that even individuals with substantial biomedical training are not immune to the gravitational pull of unfiltered digital health content. This pattern aligns with findings from comparable investigations across South and Southeast Asian university populations, where high community-level familiarity with pigmentary disorders has consistently failed to translate into proportionate rates of dermatological consultation.¹⁶

Consistent with patterns observed in comparable South Asian university populations, social media emerged as a dominant force in shaping product selection. As in the present study, 70.4% of respondents acknowledged its influence. These findings sit uncomfortably alongside the fact that 49.3% simultaneously distrusted advertising for whitening products.¹⁷ This ambivalence between scepticism and susceptibility is a psychologically nuanced phenomenon that warrants further investigation, particularly in the context of algorithmic content delivery and parasocial influences on health behavior.¹⁸

The treatment-seeking pathway showed an encouraging initial preference for dermatological consultation (59.6%), yet the supply side of self-medication told a different story. Pharmacies were the primary source of self-purchased products (54.8%), and approximately 30% of respondents reported obtaining prescription-grade formulations without valid medical authorization. This discordance between the entry point and actual product access points to a regulatory lacuna that pharmaceutical governance frameworks in Pakistan have yet to adequately address.¹⁹ The unregulated dispensing of potent

depigmenting agents, including corticosteroid-containing preparations, hydroquinone, and retinoids, across pharmacy counters without prescription verification constitutes a concrete and preventable public health risk, particularly given that 22.7% of self-medicating respondents reported adverse effects, most commonly skin irritation, erythema, and allergic contact reactions.²⁰

The product and ingredient landscape documented here warrants mechanistic consideration. Herbal and do-it-yourself remedies were the most commonly used category, with aloe vera and turmeric most often credited with perceived efficacy among home remedy users. This profile broadly aligns with self-medication patterns reported in studies across global populations, where accessibility and cosmetic marketing similarly drive ingredient selection over evidence-based guidance.²¹ Among pharmacologically active agents, vitamins B3, C, and E predominated, followed by hydroquinone, organic acids including kojic and azelaic acid, and retinoids.²² Moreover, the cohort demonstrated measured but incomplete awareness of risk. Only 29.2% considered self-medication safe, and less than a quarter (22.4%) believed over-the-counter preparations could definitely resolve the disease. Yet awareness of the cumulative harms associated with prolonged unsupervised use reached only 45.9%. This gap leaves the majority partially informed and therefore potentially more, not less, susceptible to harm through misplaced confidence in individual product choices.²³

The cross-sectional design precludes causal inference about the direction of relationships between digital media exposure, self-medication behaviour, and dermatological outcomes. At the policy level, these findings collectively argue for the mandatory enforcement of prescription requirements for hydroquinone and corticosteroid-containing preparations at the point of dispensing. It is also recommended that evidence-based pigmentary disorder modules be integrated into undergraduate health curricula, and that regulator-endorsed social media counter-messaging strategies be developed, targeting the specific platforms and content formats that demonstrably influence product selection in this demographic.

Limitations of the Study

The sample was recruited by convenience from two districts and was heavily skewed towards young, female, health-sciences students (89% in medical or health faculties), so awareness here is almost certainly higher than in the general student body, let alone the wider public. All data were self-reported and subject to recall and social-desirability bias, and several denominators differed between the “whole sample” and “affected only” items. The questionnaire was self-designed without reported formal validation, and the pre-specified logistic regression does not appear in the available output, so we report only descriptive findings. Some source tables were internally inconsistent and are flagged below rather than corrected.

CONCLUSION

Among university students in Punjab, melasma was widely recognized but seldom managed under supervision. Self-medication was common, driven by convenience, supplied mainly through pharmacies, and often involved prescription-type agents used without a prescription; roughly a quarter of users were harmed. Yet the same students wanted professional guidance and supported public awareness efforts. The practical opportunity is to convert that willingness into safer behavior through pharmacist-led counselling and referral at the point of supply, backed by targeted campaigns. Larger, more representative studies with the planned multivariable analysis are needed to identify who is most at risk and to test such interventions.

Ethical Approval

Ethical approval for the conduct of this study was obtained from the Ethical Review Committee of Quaid-e-Azam College of Pharmacy, Sahiwal, Pakistan, under Reference No. QACP/25/340. The study was conducted in accordance with the ethical principles and institutional requirements governing research involving human participants.

Data Availability

The data analyzed in this study are available from the corresponding author upon reasonable request.

Author Contributions

Conceptualization: Shakeel Ijaz, Sana Yousaf

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Data Collection: Farheen Zia, Insha Akram, Aimen Arshad, Iqra Afzal, Asma Iftikhar, Shanza Zafar

Formal Analysis: Aimen Arshad, Iqra Afzal, Asma Iftikhar, Shanza Zafar

Writing – Original Draft: Shakeel Ijaz, Farheen Zia, Insha Akram

Writing – Review & Editing: Shakeel Ijaz, Usama Rehman, Nisha Khalid.

All authors agreed to be accountable for all aspects of the study and to ensure the accuracy and integrity of the work.

Informed Consent

Informed consent was obtained from all participants before their enrollment in the study. The participants were adequately informed about the study objectives and procedures, and their privacy and confidentiality were ensured throughout the study.

Funding

No.

Conflict of Interest

No.

Acknowledgments

The authors would like to acknowledge Quaid-e-Azam College of Pharmacy, Sahiwal, Pakistan, and all individuals who contributed to the completion of this study.

Declaration of AI-Assisted Language Editing

Grammarly AI was used for language and grammar correction, while Gemini AI was used for figure generation.

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