

KNOWLEDGE, ATTITUDE, AND PRACTICE OF COSMETICS USAGE AND ASSOCIATED ADVERSE EFFECTS AMONG PHARMACY STUDENTS: AN OBSERVATIONAL STUDY

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ABSTRACT

Background: Cosmetics are widely used products intended to clean, protect, and beautify the human body. With the rapid growth of the cosmetics industry, concerns about inappropriate use and adverse effects have escalated. As future healthcare professionals, pharmacy students play a vital role in promoting safe cosmetic use. This study aimed to evaluate the knowledge, attitude, and practices (KAP) regarding cosmetic usage and associated adverse effects among pharmacy students.

Methods: A cross-sectional, questionnaire-based observational study was conducted among pharmacy students (B.Pharm, PharmD, M.Pharm, and PharmD PB) at Geethanjali College of Pharmacy, Hyderabad, over six months (July 2025–January 2026). A pre-validated, structured questionnaire assessed sociodemographic characteristics and KAP related to cosmetic usage. Convenience sampling was used. Data were analyzed using SPSS (v27) with descriptive statistics and chi-square tests; statistical significance was set at $p < 0.05$.

Results: Of 290 participants (100% response rate; 75.9% female), 52.4% demonstrated poor knowledge, while only 15.2% showed good knowledge. A moderate attitude was observed in 62.1% of participants. Good cosmetic-related practices were limited to 28.6%. Adverse cosmetic effects were reported by 36.9% of students, with acne, itching, and redness being most common. Knowledge and attitude were significantly associated ($p < 0.001$), and influenced by age, course, and year of study ($p < 0.05$). Knowledge–practice ($p = 0.456$) and attitude–practice ($p = 0.940$) associations were not significant. However, practice level was strongly associated with adverse effects ($p < 0.001$): 55.9% of those with poor practices experienced adverse effects versus 13.3% with good practices.

Conclusion: Pharmacy students demonstrated suboptimal knowledge and inadequate practices regarding cosmetic use despite a relatively moderate attitude. A significant knowledge–attitude–practice gap exists. Unsafe practices, rather than knowledge or attitude alone, were the primary determinant of cosmetic-related adverse effects. Practice-oriented curricular interventions and cosmetovigilance education are essential to bridge this gap.

Keywords: Cosmetics; Knowledge–Attitude–Practice; Pharmacy students; Adverse effects; Cosmetovigilance; Cosmetic safety; Cross-sectional study.

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INTRODUCTION

Cosmetics are products intended for application to external parts of the human body, teeth or oral mucosa for purposes including cleansing, perfuming, protecting, maintaining condition or modifying appearance. Cosmetic products include skincare, haircare, makeup, personal hygiene and related preparations. Their widespread use creates repeated

exposure to ingredients such as surfactants, preservatives, antioxidants, emollients and ultraviolet filters. Cosmetic-related adverse effects range from irritation and allergic reactions to more persistent dermatological problems, and monitoring of these effects is increasingly recognized as an important safety activity.

Previous evidence indicates that cosmetic-related

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adverse events are common but may be under-reported. A systematic review cited in the thesis reported a pooled prevalence of 41.1%, with regional estimates of 53.6% in Africa, 38.0% in South America, 35.0% in Asia and 33.4% in Europe.¹ Studies among university and health-science students have also identified frequent cosmetic use, adverse reactions and gaps in safety knowledge. Reported reactions include acne, itching, redness, irritation, hair fall and allergic manifestations. Indian studies have similarly described substantial cosmetic use and under-reporting or self-management of adverse effects.^{11,12,13,14,16,17,18}

For pharmacy students, knowledge of cosmetic ingredients, appropriate product selection, safe-use behaviours and adverse-event reporting is relevant to both personal safety and future patient counselling. However, awareness does not necessarily translate into safe behaviour. The present study therefore evaluated KAP concerning cosmetic use among pharmacy students and examined the relationship between KAP levels and cosmetic-related adverse effects.^{20,22,23,25}

METHODOLOGY

Study Design

This was a cross-sectional, questionnaire-based observational study conducted to evaluate the level of knowledge, attitude, and practice concerning the use of cosmetic products and their relationship to the occurrence of associated adverse effects among pharmacy students.

Study Population, Setting, and Duration

The target population was pharmacy students, including B.Pharm (years 1–4), PharmD (years 1–6), M.Pharm (years 1–2), and PharmD PB (years 1–3) students. The study was conducted at Geethanjali College of Pharmacy, Hyderabad, Telangana, India, over a period of six months from July 2025 to January 2026.

Inclusion and Exclusion Criteria

Students enrolled at Geethanjali College of Pharmacy who provided written informed consent and completed the questionnaire were included. Students from other institutions, those who did not sign the informed consent form, or who submitted incomplete questionnaires were excluded.

Sample Size and Sampling Method

The sample size was calculated based on a 50% response distribution with a 5% margin of error and 95% confidence level. Assuming approximately 600 enrolled students, the estimated sample size was 235; the final achieved sample was 290.

Convenience sampling was used. Participants were recruited through voluntary participation during the study period. Survey questionnaires were distributed and collected within classroom settings following a detailed explanation of the study objectives.

Questionnaire development and validation

A structured questionnaire was adopted and adapted from previously published studies of cosmetic use and associated adverse effects. It contained four sections: sociodemographic characteristics; knowledge of cosmetics; attitudes toward cosmetics; and practices related to cosmetic products. Content, construct and face validity were assessed by five faculty members from the Department of Pharmacy Practice, and their recommendations were incorporated into the final questionnaire.

Ethical considerations

The study documents state that the proposal, informed consent form and questionnaire were reviewed and approved by the Institutional Review Board of Geethanjali College of Pharmacy before study initiation (approval no. GCPK/PD25/18, dated 29 August 2025). Participation was voluntary and responses were collected confidentially.

Statistical analysis

Data were compiled in Microsoft Excel and analyzed using SPSS for Windows version 27. A Shapiro–Wilk normality test indicated non-normal distribution; therefore, descriptive statistics included frequencies, percentages, medians and interquartile ranges. Chi-square tests were used for categorical associations. Statistical significance was set at $p < 0.05$ with a 95% confidence level.

RESULTS

A total of 290 pharmacy students participated in the study, yielding a 100% response rate. The Shapiro–Wilk test confirmed non-normal distribution ($p < 0.05$), necessitating non-parametric analysis.

Reliability of the Questionnaire

The attitude scale demonstrated acceptable internal consistency (Cronbach's $\alpha = 0.738$), as did the practice scale ($\alpha = 0.700$). Cronbach's alpha was not applicable for the knowledge scale due to dichotomous items.

Sociodemographic Characteristics

The majority of participants were aged 20–22 years (62.1%), female (75.9%), and Hindu (83.5%). Over half were enrolled in B.Pharm (55.5%), followed by PharmD (41.8%). The largest group was in the 4th year of study (30.0%). Most students resided in city areas (54.5%), reported no allergies (83.8%), and no family history of allergy (92.1%) [Table 1].

Table 1: Sociodemographic characteristics of participants (N = 290)

Variable	Category	N (%)
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Age (years)	17–19	97 (33.4%)
	20–22	180 (62.1%)

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	23–25	13 (4.5%)
Gender	Male	70 (24.1%)
	Female	220 (75.9%)
Course	B.Pharm	161 (55.5%)
	PharmD	121 (41.8%)
	M.Pharm	3 (1.0%)
	PharmD PB	5 (1.7%)
Year of study	1st year	44 (15.2%)
	2nd year	65 (22.4%)
	3rd year	68 (23.5%)
	4th year	87 (30.0%)
	5th year	21 (7.2%)
	6th year	5 (1.7%)
Native location	City	158 (54.5%)
	Urban	64 (22.1%)
	Rural	68 (23.4%)
Allergies	None	243 (83.8%)
	Foods	25 (8.6%)
	Medications	5 (1.7%)
	Others	17 (5.9%)
Family history	No	267 (92.1%)
	Yes	23 (7.9%)

Knowledge Regarding Cosmetics

Knowledge was uneven across domains. Combination skin was reported by 30.7%, 68.3% correctly identified the stated skincare application order, and 75.5% knew the difference between natural, synthetic and medicated cosmetic products. Awareness of harmful ingredients was 65.5%. However, only 29.0% correctly identified the meaning of “non-comedogenic,” 31.7% correctly identified “dermatologically tested,” and 40.0% knew that cosmetic adverse effects could be reported and where to report them. [Table 2]

Table 2. Knowledge regarding Cosmetics among Participants (N=290)

Knowledge item	Key response	n (%)
Skin type	Combination	89 (30.7%)
Hair type	Straight	124 (42.7%)

Skin condition	No	242 (83.4%)
Correct skincare application order	Cleanser → Serum → Moisturizer → Sunscreen	198 (68.3%)
Difference between cosmetic types	Yes	219 (75.5%)
Aware of harmful cosmetic ingredients	Yes	190 (65.5%)
Meaning of “hypoallergenic”	Less likely to cause allergy	146 (50.3%)
Meaning of “non-comedogenic”	Unlikely to clog pores	84 (29.0%)
Meaning of “dermatologically tested”	Evaluated by skin testing	92 (31.7%)
Aware of potential long-term risks	Yes	195 (67.2%)
Aware that adverse effects can be reported and where to report	Yes	116 (40.0%)

Attitude Towards Cosmetics

Attitudes were generally favourable toward cosmetic safety. Overall, 79.0% agreed or strongly agreed that stricter cosmetic regulation was needed, 62.0% agreed or strongly agreed that cosmetics improve appearance and self-confidence, and 62.7% agreed or strongly agreed that cosmetics can cause health issues. Brand reputation and quality were considered more important than price by 75.2%. [Table 3]

Table 3. Attitude towards Cosmetics among Participants (N=290)

Attitude statement	Response category	n (%)
Cosmetics are important in daily routine	Agree/Strongly agree	105 (36.2%)
Societal beauty standards influence cosmetic use	Agree/Strongly agree	133 (45.8%)
Brand reputation & quality are more important than price	Agree/Strongly agree	218 (75.2%)
Need for stricter cosmetic regulations	Agree/Strongly agree	229 (79.0%)
Cosmetics improve appearance & self-confidence	Agree/Strongly agree	180 (62.0%)
Cosmetic-induced adverse effects are common in India	Agree/Strongly agree	155 (53.5%)
Cosmetics can cause health issues	Agree/Strongly agree	182 (62.7%)

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Excess lipstick use causes kidney failure	Agree/Strongly agree	100 (34.5%)
Excess hair spray/colour causes hair damage	Agree/Strongly agree	251 (86.6%)
Prolonged makeup without cleansing causes aging	Agree/Strongly agree	211 (72.7%)
Avoiding sulphates is important for skin and hair	Agree/Strongly agree	172 (59.3%)

Practices Related to Cosmetics

Daily use was highest for personal hygiene products (66.9%) and skincare products (48.6%). Haircare products were commonly used often (41.0%), while makeup was mostly used occasionally (50.4%). Regarding safety practices, 42.4% always checked ingredient labels, but only 14.8% always performed patch testing. Most participants (95.5%) reported not using expired products. The majority used 1–2 cosmetic products per day (72.8%) and applied cosmetics once daily (61.0%). Cosmetic sharing was reported by 44.1% of respondents. Adverse effects were reported by 36.9% of participants, with most occurring 1–2 times (24.8%) and observed within 24 hours of use (16.2%). [Table 4]

Table 4. Selected cosmetic-use practices and adverse effects (N=290)

Practice/adverse-effect indicator	n (%)
Daily personal-care product use	194 (66.9)
Daily skincare use	141 (48.6)
Often using haircare products	119 (41.0)
Occasional makeup use	146 (50.4)
Always checking ingredient labels	123 (42.4)
Always performing patch testing	43 (14.8)
Do not continue expired products	277 (95.5)
Use 1–2 cosmetic products/day	211 (72.8)
Share cosmetics	128 (44.1)
Consult doctors for safer cosmetics	119 (41.0)
Experienced cosmetic adverse effect	107 (36.9)

Association Between KAP Levels and Adverse Effects

A statistically significant association was found between knowledge and attitude levels ($\chi^2 = 21.175$, p

< 0.001), with good knowledge corresponding to more positive attitudes. However, no significant association was observed between knowledge and practice ($p = 0.456$) or attitude and practice ($p = 0.940$). Importantly, practice level was strongly associated with adverse effects ($\chi^2 = 19.917$, $p < 0.001$): 55.9% of participants with poor practices experienced adverse effects compared to only 13.3% with good practices [Table 5,6].

Table 5: Summary of chi-square associations between KAP levels and adverse effects (N=290)

Association tested	χ^2 value	df	p-value	Interpretation
Knowledge $\times$ Attitude	21.175	4	< 0.001	Significant
Knowledge $\times$ Practice	3.649	4	0.456	Not significant
Attitude $\times$ Practice	0.785	4	0.940	Not significant
Practice $\times$ Adverse effects	19.917	1	< 0.001	Significant

Table 6: Association between practice level and cosmetic-related adverse effects (N = 290)

Practice level	Adverse effects present N (%)	No adverse effects N (%)	Total
Poor practice	66 (55.9)	52 (44.1)	118
Moderate practice	30 (33.7)	59 (66.3)	89
Good practice	11 (13.3)	72 (86.7)	83
Total	107 (36.9)	183 (63.1)	290

Association Between Sociodemographic Variables and KAP Levels

Age group, course of study, and year of study were significantly associated with knowledge levels ($p < 0.05$), suggesting that academic exposure contributes to awareness. Year of study was also significantly associated with attitude levels ($p = 0.034$). Native location showed a borderline association with attitude ($p = 0.050$). However, gender, religion, allergy status, and family history were not significantly associated with KAP levels [Table 7].

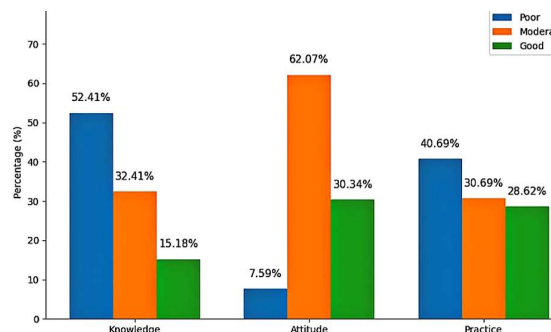
Table 7: Association between sociodemographic characteristics and KAP levels (N = 290)

Sociodemographic variable	Knowledge p-value	Attitude p-value	Practice p-value
Age group	0.001*	0.010*	0.329
Gender	0.471	0.968	0.761
Religion	0.507	0.054	0.859

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Course of study	0.001*	0.006*	0.180
Year of study	0.001*	0.034*	0.676
Native location	0.067	0.050*	0.331
Allergies	0.963	0.275	0.564
Family history of allergy	0.234	0.825	0.498

Figure 1: Distribution of Knowledge, Attitude & Practice (KAP) Levels Among Study Participants (N = 290)



DISCUSSION

This study assessed the knowledge, attitude, and practices regarding cosmetic use and associated adverse effects among 290 pharmacy students. The findings revealed a predominant moderate attitude (62.1%) but significant gaps in knowledge (52.4% poor) and practices (40.7% poor). Crucially, 36.9% of participants experienced cosmetic-related adverse effects, with acne, itching, and redness being the most common.

The knowledge findings are consistent with similar studies among healthcare students. While basic awareness of cosmetic types (75.5%) and skincare routines (68.3%) was adequate, technical understanding of label terminology such as 'non-comedogenic' (29.0%) and 'dermatologically tested' (31.7%) was notably limited. This parallels findings from prior research demonstrating restricted label literacy among student populations. Furthermore, only 40% of participants knew about adverse effect reporting systems, highlighting a critical gap also identified in comparable studies.

Attitude scores were generally positive, with 79.0% supporting stricter cosmetic regulations and 62.7% acknowledging potential health risks. However, the persistence of misconceptions, such as the belief that lipstick use causes kidney failure, indicates the need for improved critical evaluation of cosmetic safety claims. These findings align with previous studies showing favorable attitudes but gaps in the critical assessment of cosmetic safety.

The most significant finding was the knowledge–attitude–practice gap. Although knowledge and attitude were significantly associated ($p < 0.001$), neither knowledge nor attitude translated into safe practices ($p = 0.456$ and $p = 0.940$, respectively). This disconnect between awareness and behavior is well-documented in health behavior research and suggests that knowledge-based interventions alone are insufficient to modify cosmetic-use practices. The influence of habits, convenience, social factors, and brand-driven purchasing decisions may override awareness of safety considerations.

Importantly, practice level was strongly associated

with adverse effects ($p < 0.001$). Among participants with poor practices, 55.9% experienced adverse effects, compared to only 13.3% of those with good practices. This dose-response relationship confirms that unsafe cosmetic-use behaviors—including infrequent patch testing, cosmetic sharing, and inadequate ingredient checking—directly contribute to adverse outcomes. The predominance of skincare products as the leading cause of adverse reactions is biologically plausible given their frequent use and prolonged skin contact.

Sociodemographic analysis revealed that academic progression—age, course, and year of study—significantly influenced knowledge and attitude but not practice. This suggests that while pharmacy education improves theoretical understanding, it does not adequately translate into safer cosmetic behaviors, reinforcing the need for practice-oriented training within the curriculum.

The findings partially support the alternate hypothesis: while knowledge and attitude do not directly predict safer practices, unsafe practices are a primary determinant of cosmetic-related adverse effects. This underscores the importance of behavioral interventions alongside educational programs.

CONCLUSION

This study highlights suboptimal knowledge and inadequate practices regarding cosmetic use among pharmacy students, despite a relatively moderate attitude. A significant knowledge–attitude–practice gap exists, with unsafe practices—rather than knowledge or attitude alone—serving as the primary determinant of cosmetic-related adverse effects. Academic progression improved knowledge and attitude but did not significantly influence practice behavior. These findings underscore the urgent need to strengthen practice-oriented training in the pharmacy curriculum. Integrating comprehensive cosmetovigilance education that emphasizes practical skills—ingredient checking, patch testing, and adverse effect reporting—is essential to bridge the identified gap and empower future pharmacists to ensure safe cosmetic use for themselves and their communities.

LIMITATIONS

The study was conducted at a single pharmacy institution, limiting generalizability. The cross-sectional design precludes causal inference. Self-administered questionnaires may be subject to recall and social desirability bias. Convenience sampling may introduce selection bias, as students with greater interest in cosmetics may have been more likely to participate. The study focused exclusively on pharmacy students, limiting comparisons with other student populations or the general public.

RECOMMENDATIONS

Future research should involve multi-center and longitudinal studies to improve generalizability and assess long-term behavioral changes following educational interventions. Intervention-based programs focusing on cosmetovigilance awareness, patch testing, ingredient evaluation, and adverse event reporting should be implemented and evaluated. Integration of cosmetovigilance into pharmacy curricula and establishment of structured reporting systems within institutions may enhance safe cosmetic practices among students.

DECLARATIONS

Ethics approval: Institutional Review Board approval was obtained from Geethanjali College of Pharmacy (GCPK/PD25/18; 29 August 2025).

Informed consent: Written informed consent was obtained from participants.

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