ISSN: 3049-8074

*Research Article*

Journal of Clinical Medicine & Health Care

# Awareness and Practices of Cosmetovigilance Among Female Cosmetic Users in Lahore, Pakistan

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**Received:** June 16, 2025; **Accepted:** June 23, 2025; **Published:** July 07, 2025

**ABSTRACT**

Cosmetovigilance has become vital in maintaining the safety of cosmetic products, however consumer understanding and compliance to its standards remains minimal. The purpose of this study was to gain insights on cosmetovigilance by analysing the knowledge, behaviors, attitudes, and perceptions of female cosmetic users in Lahore, Pakistan. A cross-sectional study was performed at a private university in Lahore in which data was collected from 687 students. The data demonstrated a significant amount of cosmetic usage, but considerable gaps in knowing potential side effects and safety measures. Acne, Skin irritation and hyperpigmentation were the most reported adverse effects, and self-treatment was the pre-dominant response with minimal trust on professional consultation. A signiant number of participants did not check the ingredients on label and did not perform allergy tests before utilizing the new product. These findings emphasize the urgent need for regulatory enforcement, consumer education and establishment of comprehensive cosmetovigilance frameworks to foster the safer cosmetic practices in Pakistan.

**Keywords:** Cosmetovigilance, Cosmetic Safety, Adverse Effects, Consumer Awareness, Pakistan

## Introduction

The U.S. Food and Drug Administration (FDA) defines cosmetics in Sec. 201(i) as "A cosmetic is a product, except soap, intended to be applied to the human body for cleansing, beautifying, promoting attractiveness, or altering the appearance" [1]. Products included in this definition include skin moisturizers, nail glosses, perfumes, cleansing shampoos, hair colours, hair dyes, and antiperspirants, as well as any substance that aims for utilize as a cosmetic [2].

As different concerns about adverse effects of cosmetic product, cosmetovigilance has become a major public health initiative worldwide. Countries like Egypt have reported increasing trends of cosmetics use among females students with reporting of at least one adverse event including acne, eye inflammations and skin redness [3]. Other toxicological studies held in the Saudi Arabia revealed heavy metals contamination in cosmetic products, emphasizing the need for active safety monitoring [4]. Likewise in Developed Regions like European Union and Japan, advanced regulations for reporting and monitoring adverse effects exist. Unlike in India, the framework exists but it's in its developmental stages. The USA has enhanced regulations under MoCRA, aiming to improve the cosmetovigilance including to the gaps compared to EU practices [5]. In Turkiye, the reporting is aligned with EU-regulations but there's lack of mandatory post-marketing vigilance and awareness about the adverse effects of cosmetic products [6]. Therefore, globally cosmetovigilance is evolving in order to provide the safe use of cosmetics.

To identify the potential risks to health due to cosmetics adverse effects, cosmetovigilance involves the systematic monitoring, reporting, evaluation and prevention of hazardous effects while ensuring safety. Recently in Pakistan, regulation authorities have

**Citation:** Faryal Fatima, Ovais Ullah Shirazi, Waqas Akram, Mahtab Ahmad Khan, Badar Muneer, et al. Awareness and Practices of Cosmetovigilance Among Female Cosmetic Users in Lahore, Pakistan. J Clin Med Health Care. 2025. 2(3): 1-7. DOI: doi.org/10.61440/JCMHC.2025.v2.27

been working significantly on cosmetovigilance. The Cosmetics Rules 2009 were amended to include more strict guidelines that focuses on safe use of active ingredients, proper labelling, and product safety on a global scale. Cosmetics Rules 2023 implemented under Drug Regulatory Authority of Pakistan (DRAP) aim towards strictly monitored production, marking and retailing of cosmetic products. Specifically, these regulations focus on critical safety concerns such as the presence of toxic chemicals in cosmetic products and labelling, and inadequate storage conditions. These rules are designed to minimize the risks related to use of cosmetics in Pakistan. Moreover, there is a lack of public awareness about product safety and continual improper use of cosmetics which is a major concern [7].

However, in the past decade, there has been an increase in negative reactions to cosmetic products as studies show use of unauthorized, low quality products containing hydroquinone in skin-lightening creams, paraphenylenediamine (PPD) in hair dyes, mercury and lead in cosmetics are commonly linked to skin irritations leading to allergies and contact dermatitis [8]. A study conducted in in Abbottabad, Pakistan has revealed a significant reliance on chemical-based cosmetics regardless of adverse effects like pimples, redness etc. Most individuals do not consult or report those adverse events [9]. These reactions, ranging from mild irritations to severe allergic responses, highlight the importance of increased safety measures. It has been established that the use of toxic heavy metals, such as lead, mercury and arsenic, in cosmetic formulations can cause adverse effects. Eventually these metals, often present in skin lightening products and lipsticks are known to build up throughout the body; over time these substances can accumulate into the system and cause organ damage or neurological problems [10].

In Pakistan, the use of cosmetic products has significantly increased and public especially females are more concerned about potential adverse reactions that occur by using face creams and lipsticks. The prevalence of cosmetic use in Lahore has risen, and it challenges regularity authorities to monitor and evaluate the risk of skin problems like irritations, allergies, hyperpigmentation, urticaria etc. The prevalence and patterns of cosmetic-related adverse effects in Pakistan, particularly in urban areas like Lahore, have not been extensively studied despite their growing popularity. So, the aim of this study is to recognize the gap that is addressed by examining the prevalence of adverse reactions and uncovering the main drivers of the health risks. This will help public health professionals to establish better cosmetic safety standards in packaging and use while spreading the consumer awareness. Continued surveillance in term of the cosmetics outcomes and its effects on health by regularities like DRAP should consider as they may adversely affect women health. Moreover, such information will help to spread awareness to consumers who are more susceptible to the irreversible effects of chemicals contained in cosmetic products [11, 12].

## Materials and Methods

### Study Design and Setting

The current study was conducted at a private university of Lahore, Pakistan, from October 2024 to January 2025. Female students from undergraduate and graduate schools in multiple disciplines were volunteered in the study. Eight hundred questionnaires were disseminated, of which 687 were completed and returned, resulting in a response rate of 85.9%. Among them, 598 respondents indicated the use of cosmetic goods and were included. Participants were chosen by convenience sampling to guarantee diversity among academic years and disciplines.

### Development of the Questionnaire

The questionnaire used in present study was developed after extensive review of literature to achieve the study objectives [3, 9, 13]. It was developed to thoroughly study cosmetic usage behaviors, adverse effects, and awareness of safety precautions. The questionnaire was divided into four sections: demographic profile, cosmetic product use and purchase habits, adverse effects and issues attributable to cosmetics, and views toward cosmetic safety. To preserve uniformity, enable data analysis and considering English as a primary language in the university, the questionnaire was prepared in English. The structured framework was created to promote clarity and ease of response for all participants.

### Pilot Study

Pilot research was performed to evaluate the clarity, credibility, and validity of the questionnaire. Guided by research from global cosmetovigilance research, the questionnaire was revised to ensure its usefulness in capturing habits, adverse effects, and safety procedures. Minor revisions were made based on participant input, improving the precision of questions on shopping patterns and safety behaviors. This procedure assessed the questionnaire for full-scale acceptance.

### Sample Size

The sample size for this investigation was estimated using the Raosoft sample size calculator (http://www.raosoft.com/samplesize.html). The calculated sample size was 544 ± 100.

### Data Collection

To ensure rigorous data collection, 687 valid responds were obtained, exceeding the minimum required sample size. Data were collected through a combination of online and face to face surveys. Online surveys were disseminated via digital media to enable broad participation across the Lahore. The inclusion criteria were as follows, Female users of cosmetic items from the general population of more than 16 years, Residency inside Lahore either urban or rural areas and exhibit willingness to participate in the study.

### Data Analysis

The analysis of the data was done utilizing the Statistical Package for Social Sciences (SPSS) software. Descriptive statistics were applied to the demographic features and levels of understanding regarding cosmetic safety. Comparative statistics was applied to determine the purchase pattern of cosmetics, management of adverse effects and benefits of cosmetic use.

## Results

### Socio-Demographic Characteristics

A total of 687 responses were evaluated, with 598 participants reporting frequent use of cosmetics, with most of them (83.3%, n=498) aged within <16–25 years, whereas 16.7% (n=100) were older over 25 years. Most respondents were single (80.8%, n=483), however 19.2% (n=115) were married. Regarding educational credentials, 73.6% (n=440) of those who participated

possessed an undergraduate degree, while 26.4% (n=158) had a university degree. Residents of urban areas represented most of the sample (78.9%, n=472), with those living in the countryside making up 21.1% (n=126). Monthly Income for the family was recorded as PKR 50,000–150,000 by 55.5% (n=332) of participants, while 44.5% (n=266) reported earnings over PKR 150,000. Furthermore, 54.3% (n=325) of the participants were from families with more than five individuals, and 45.7% (n=273) had families with five or less people.

**Table 1: Sociodemographic Characteristic of Participants**

| Variables | N (%) |
|---|---|
| Age: | |
| <16-25 years | 498 (83.3) |
| Older than 25 years | 100 (16.7) |
| Marital Status: | |
| Single | 483 (80.8) |
| Married | 115 (19.2) |
| Level of Education: | |
| Undergraduate degree | 440 (73.6) |
| Graduate degree | 158 (26.4) |
| Residency: | |
| Urban | 472 (78.9) |
| Rural | 126 (21.1) |
| Family Income: | |
| 50,000-150,000 PKR | 332 (55.5) |
| More than 150,000 PKR | 266 (44.5) |
| Family Size: | |
| Less than 5 members | 273 (45.7) |
| More than 5 members | 325 (54.3) |

Cosmetic Purchasing Patterns

Participants displayed various purchasing patterns, with 40.8% (n=244) buying cosmetics "as needed" and 21.7% (n=130) shopping "once a month." Less regular behaviors included buying "every 2 months" (19%, n=114), "twice a month" (9.5%, n=57), and "every 6 months" (8.9%, n=53).

Beauty stores were the most common purchasing place (31.1%, n=186), followed by online platforms (27.6%, n=165) and supermarkets (21.1%, n=126). Pharmacies (13.2%, n=79) and local shops (7%, n=42) were less liked. Irregular purchasers ("as needed") predominantly favored beauty stores and online platforms, whereas regular monthly buyers exhibited a more even distribution among supermarkets, beauty stores, and pharmacies. These developments underline the relevance of accessibility and variety in purchase decisions.

**Table 2: Purchasing Pattern of cosmetics**

| | Supermarkets | Beauty stores | Online platforms | Pharmacy | Local Shops | Total |
|---|---|---|---|---|---|---|
| Twice a month | 13 | 19 | 15 | 7 | 3 | 57 |
| Once a month | 32 | 44 | 32 | 11 | 11 | 130 |
| Every 2 month | 23 | 23 | 39 | 19 | 10 | 114 |
| Every 6 month | 8 | 19 | 17 | 6 | 3 | 53 |
| As needed | 50 | 81 | 62 | 36 | 15 | 244 |
| Total | 126 | 186 | 165 | 79 | 42 | 598 |

**Types of Cosmetic Products Used**

Participants in the study reported different preferences for cosmetic goods, with the biggest number (36.3%, n=217) indicating the usage of all sorts of cosmetics, including lip care, face care, hair care, and eye care products. Face care items were the most popular individual category, utilized by 32.6% (n=195) of respondents. Hair care products were utilized by 13.9% (n=83), followed by lip care products at 12.7% (n=76). Eye care items were the least commonly utilized, reported by 4.5% (n=27). These data reveal a strong preference for face care products and multi-category use, indicating the significance of these categories in participants' cosmetic practices.

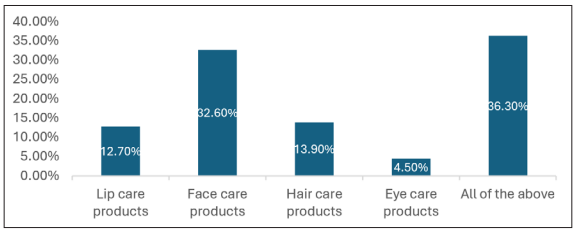


**Figure 1:** Types of Cosmetic Products Used

Awareness and Practices Related to Cosmetic Safety

The participants indicated varying levels of understanding and habits regarding cosmetic safety. Over half (51.5%, n=308) of respondents routinely checked the expiry date of cosmetic goods before purchasing, while 16.7% (n=100) did so often. However, 6.7% (n=40) never checked expiry dates, showing a gap in safety awareness. Similarly, just 21.1% (n=126) of respondents consistently tested for allergies before using new items, while 23.6% (n=141) reported never completing allergy testing. When asked about the usage of natural versus synthetic beauty products, 33.6% (n=201) sometimes favored herbal items, with 26.1% (n=156) consistently choosing natural options. Regarding awareness of banned or haram substances in cosmetic items, 38.8% (n=232) routinely checked, while 14.9% (n=89) never considered this consideration. In terms of practices, 55% (n=329) of participants reported always removing makeup before sleeping, while 11% (n=66) never followed this practice. The use of water or other substances to modify cosmetic items was uncommon, with only 13% (n=78) doing so always and 34.1% (n=204) never indulging in this activity.

These data demonstrate a moderate degree of awareness of cosmetic safety measures, with major gaps in allergy testing and knowledge of hazardous chemicals, suggesting a need for increased education and awareness initiatives.

**Table 3: Awareness and Practices Related to Cosmetic Safety**

| | Always N (%) | Often N (%) | Sometimes N (%) | Rarely N (%) | Never N (%) |
|---|---|---|---|---|---|
| How frequently do you use cosmetic products? | 154 (25.8) | 165 (27.6) | 187 (31.3) | 70 (11.7) | 22 (3.7) |
| How frequently do you use skincare and hair care products? | 146 (24.4) | 172 (28.8) | 180 (30.1) | 74 (12.4) | 26 (4.3) |
| How frequently do you use fragrance products (perfumes, deodorants, etc.)? | 262 (43.8) | 134 (22.4) | 108 (18.1) | 58 (9.7) | 36 (6.0) |
| Do you purchase cosmetic products without checking their ingredients? | 123 (20.6) | 119 (19.9) | 151 (25.3) | 79 (13.2) | 126 (21.1) |
| Do you prefer natural beauty products (herbal) over conventional ones (synthetic)? | 156 (26.1) | 129 (21.6) | 201 (33.6) | 66 (11.0) | 46 (7.7) |
| Do you check the expiry date before purchasing cosmetics? | 308 (51.5) | 100 (16.7) | 98 (16.4) | 52 (8.7) | 40 (6.7) |
| Do you ever share your cosmetic products with others? | 121 (20.2) | 127 (21.2) | 174 (29.1) | 95 (15.9) | 81 (13.5) |
| Do you remove your makeup before sleeping? | 329 (55.0) | 84 (14.0) | 73 (12.2) | 46 (7.7) | 66 (11.0) |
| Do you test for allergies before using new cosmetic products? | 126 (21.1) | 104 (17.4) | 118 (19.7) | 109 (18.2) | 141 (23.6) |
| Do you add water or other substances to modify your cosmetics before use? | 78 (13.0) | 80 (13.4) | 131 (21.9) | 105 (17.6) | 204 (34.1) |
| Do you ask about products used on your skin or hair during beauty salon visits? | 148 (24.7) | 130 (21.7) | 150 (25.1) | 82 (13.7) | 88 (14.7) |
| Do you check for any banned cosmetic products by authorities? | 117 (19.6) | 107 (17.9) | 133 (22.2) | 110 (18.4) | 131 (21.9) |
| Do you check for any haram/banned ingredient in cosmetic products? | 232 (38.8) | 90 (15.1) | 105 (17.6) | 82 (13.7) | 89 (14.9) |

**Factors Influencing Cosmetic Purchasing Decisions**

Participants reported numerous factors impacting their cosmetic shopping decisions. Among the respondents, brand reputation was the most influential element, identified by 28.6% (n=171), followed by components at 18.4% (n=110). Price was a consideration for 13% (n=78), whereas packaging affected only 7% (n=42). Notably, 32.9% (n=197) of participants evaluated all five aspects combined while making purchasing selections. These results imply that brand reputation and product components are key predictors of customer behavior, underscoring the need of trust and transparency in the cosmetic sector.

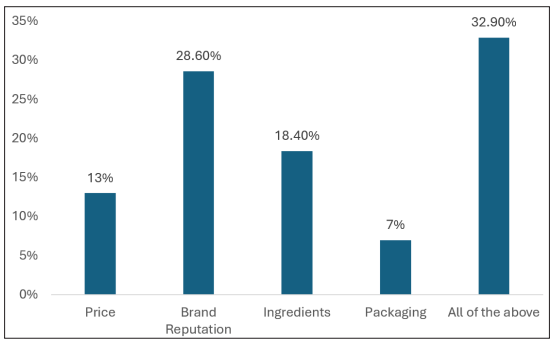


**Figure 2:** Factors Influencing Cosmetic Purchasing Decisions

**Adverse Effects and Management Strategies**

Participants reported numerous adverse effects linked with cosmetic product use, with the most prevalent being acne or pimples, affecting 35.2% (n=210) of respondents. Other frequently reported concerns included skin irritation (20.4%, n=122), eye discomfort (12.5%, n=75), and hyperpigmentation (12.2%, n=73). Notably, 19.6% (n=117) of respondents reported experiencing a combination of these undesirable effects. In controlling adverse reactions, the most prevalent approach was ceasing the use of the product (46%, n=275), followed by home treatments (18.1%, n=108). Professional interventions were less common, with 18.6% (n=111) contacting a dermatologist or doctor and 10.1% (n=60) consulting a pharmacist. A smaller proportion utilized over-the-counter drugs (7.2%, n=43). These findings reveal a preference for self-managed treatments, such as stopping product use and home cures, over professional advice, suggesting a deficit in access to or awareness of dermatological care.

**Table 4: Adverse Effects and Management Strategies**

| | Stopped using the product | Consulted a dermatologist/doctor | Consult a pharmacist | used over the counter medications | used home remedies | Total |
|---|---|---|---|---|---|---|
| Skin irritation | 74 | 22 | 03 | 11 | 12 | 122 |
| Eye irritation | 32 | 15 | 10 | 06 | 12 | 75 |
| Hyperpigmentattion | 24 | 22 | 14 | 05 | 08 | 73 |
| Acne or pimples | 104 | 34 | 18 | 16 | 38 | 210 |
| All of the above | 41 | 18 | 15 | 05 | 38 | 117 |
| Total | 275 | 111 | 60 | 43 | 108 | 597 |

**Reasons and Benefits of Cosmetic Use**

Participants stated numerous motivations for using cosmetics, with the most popular being personal cleanliness, cited by 25.6% (n=153) of respondents. This was followed by the desire to mask skin defects (22.4%, n=134) and enhance beauty (19.7%, n=118). Motivations associated to special occasions accounted for 18.7% (n=112), whereas professional requirements were indicated by 13.5% (n=81). In terms of perceived benefits, raising self-confidence was the most often reported advantage across every group (32.3%, n=193), followed by enhancing appearance (30.4%, n=182). Other major benefits included enhancing skin health (19.2%, n=115), offering environmental protection (10.4%, n=62), and cultural benefits (7.7%, n=46). These findings underline both utilitarian and aesthetic incentives for cosmetic use, demonstrating the relevance of personal hygiene and confidence among participants.

**Table 5: Reasons and Benefits of Cosmetic Use**

| | Boosts self-confidence | Enhances Appearance | Improve skin health | Provides environmental protection | Cultural benefits | Total |
|---|---|---|---|---|---|---|
| To enhance beauty | 53 | 37 | 19 | 2 | 7 | 118 |
| To cover skin imperfections | 45 | 45 | 28 | 9 | 7 | 134 |
| For professional Requirements | 19 | 28 | 15 | 12 | 7 | 81 |
| For personal hygiene | 49 | 34 | 36 | 27 | 7 | 153 |
| For special occassions | 27 | 38 | 17 | 12 | 18 | 112 |
| Total | 193 | 182 | 115 | 62 | 46 | 598 |

**Discussion**

Cosmetics have been an important way for people to improve their looks [14] and women have been the main users of cosmetics as compared to men [15, 16]. This study shows that younger females of age 16–25 years use cosmetics more frequently (83.3%) than older females (16.7%) that is align with the previous studies held in India [17, 18]. It is also observed that 73.6% of undergraduate females use cosmetics whereas; after graduation, it lessens up to 26.4% which can be interpreted that young adults are more affected by beauty standards. It is also observed that 78.9% females use cosmetics lived in urban areas than rural areas 21.1% which aligns with the findings of Egypt [3] and Netherland [19], the reason may be that urbans are more exposed to diverse product offerings and marketing.

In this study, it's observed that participants with moderate family income (50,000-150,000 PKR) accounted for 55.5% of cosmetic usage that is more than participants with high income (More than 150,000 PKR) that can be interpreted that middle income customers use more cosmetics because of social desirability and economical cosmetic brands that aligns with the study in Saudi Arabia [20] where income affected the selection of cosmetic brand and purchasing frequency of cosmetics. Family size also affected the cosmetic usage pattern as study shows more cosmetics (54.4%) is consumed by the participants with more than 5 members of the family compared to participants with less than 5 members of the family (45.7%) which aligns with the study in Europe [21] where researcher found that larger families affected skincare and haircare purchases due to collective product usage and sharing of cosmetics is also common in extended families [9].

According to this study, 31.1% people purchase cosmetics from beauty stores and 27.6% purchase from online platforms, similar pattern was observed in the study occurred in India [17], where online platforms acquired popularity because of ease. However, the lesser dependency on pharmacies (13.2%) conflicts with the studies in Egypt and Malaysia [3, 13] , where pharmacies are considered as reliable suppliers of high quality cosmetics. This study shows that 28.6% people purchase cosmetics based on the brand reputation which reflects results from Turkey [22] emphasizing the worldwide pattern of reliability affecting customer behavior.

The study shows that 36.3% consumers use all of the skincare and haircare products suggesting a holistic strategy for personal hygiene and beauty. These results correlate with studies related to global beauty trends, which explains the high demand for skincare products because of the people's awareness about skin health and environmental protection [23]. Fragrance products were frequently

used by participants, with 43.8% using them daily which aligns with the study in Ethiopia [24]. The Netherlands cosmetovigilance program observed that fragrance-related sensitivities are one of the main causes of dermatological visits by patients, were among the top causes of cosmetic-related dermatological visits, that requires strict regulatory actions [19]. 51.5% of participants check expiry dates before purchasing the cosmetics , and 19.6% check for banned products is parallel with findings from Malaysia [13], which revealed similar inconsistencies in safety behaviors. This study shows that 33.6% participants preferred herbal products over synthetic products while 26.1% preferred only natural products which aligns with the study of Ethiopia [24]. Only 21.1% people prefer allergy testing before using the product reflects findings from India [18] and Ethiopia [24] where individuals typically overlook the value of pre-use testing. These trends underline a worldwide need for awareness efforts on the hazards of cosmetics.

The high incidence of adverse effects such as acne (35.2%) and skin irritation (20.4%) corresponds with studies in Italy [14], where comparable skin-related concerns were found. It's more common to manage adverse reactions by the consumers themselves in which 46% preferred to discontinue using the product and only 18.6% consumers consulted a dermatologist after the adverse effects were shown aligns with the study of Netherlands [19], where inadequate reporting of adverse effects remains a concern.

Personal hygiene (25.6%) and self-confidence (32.3%) emerged as key motivators for cosmetic use, consistent with studies from India [17], which mentions that cosmetic use improve the feelings, which could contribute to self-confidence.

**Global Context and Challenges**

Inadequate reporting of side effects and absence of a consistent cosmetovigilance system are prevalent topics throughout research [22]. European nations, although having sophisticated rules, exhibit diversity in the application of cosmetovigilance systems [21]. Developing nations like Pakistan, India, and Ethiopia confront extra issues owing to poor consumer education and governmental control [9, 24, 25]. To overcome these gaps, focused educational initiatives are necessary to encourage safe behaviors, such as allergy testing and ingredient understanding [26]. Regulatory entities should improve supervision and enforce labelling regulations to protect consumer safety. Establishing a rigorous cosmetovigilance framework, comparable to those in Europe and Turkey, might increase reporting and monitoring of adverse effects.

Building on these results, subsequent studies should investigate the efficacy of treatments aiming at promoting safety awareness and cosmetovigilance behaviors. Investigating the impact of socioeconomic considerations, cultural influences, and access to healthcare in developing cosmetic use practices might give new insights.

**Conclusion**

The frequent use of home remedies and the low rate of professional consultation for adverse effects point to limited engagement with healthcare services. These insights emphasize the importance of promoting cosmetovigilance and enhancing public awareness about cosmetic safety. Transparent labelling, public health campaigns, and strengthened regulatory frameworks are critical for empowering consumers to make informed decisions and reduce the risk of adverse effects.

**Future Recommendations**

Future research should focus on evaluating the effectiveness of educational and regulatory interventions to improve cosmetic safety practices. Expanding the study scope to include diverse demographic groups and exploring cultural and socioeconomic influences can provide a more comprehensive understanding of cosmetic use and its implications.

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