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Knowledge, Pattern of Use and Outcomes of Eyelash Cosmetic Products among Women in Saudi Arabia: A Cross-Sectional Study

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Abstract **Objectives:** Eye cosmetics such as eyeliners, eyelash extensions, contact lenses and mascara are widely used for aesthetic purposes, yet improper or prolonged use may harm ocular health. This study aimed to evaluate the knowledge, practices and self-reported ocular symptoms associated with eyelash and eyelid cosmetic use among a convenience sample of Saudi women. **Methods:** A cross-sectional survey was conducted between October 2024 and March 2025 among 448 women predominantly aged 18-24 years recruited via social media and online forums. Participants completed a structured questionnaire on demographics, cosmetic use and ocular complaints. Data were analyzed using descriptive statistics and chi-square tests. Composite outcome variables ('ocular complaints') were defined as the presence of any self-reported symptom, including allergic reactions, lash thinning, itching or discomfort. STROBE guidelines were followed for reporting observational studies. Handling of missing data: all questions were mandatory in Google Forms, preventing incomplete responses; remaining missing data were minimal (<5%) and not imputed. **Results:** Overall, 93.3% (n = 418) reported using eyelash or eyelid cosmetics, with 75.4% n = 338) using them for >3 years. While 50.2% n = 225) reported no symptoms, others noted self-reported complaints such as allergic reactions (33.5%, n = 150), lash thinning (16.5%, n = 74), itching (22.8%, n = 102) and discomfort (21.4%, n = 96). Only 8.3% (n = 37) sought medical care. Awareness of potential risks was noted in 30.1%, Higher awareness was significantly associated with reduced periorbital irritation, swelling and rash around the eye, (p = 0.054) but did not consistently influence future use intentions among those prioritizing aesthetic outcomes. Unsafe practices, including prolonged reuse of eyelash extensions and inadequate makeup removal, were significantly associated with ocular complaints (p <0.05). **Conclusions:** Eyelash and eyelid cosmetics are highly prevalent among the studied population and linked to preventable ocular surface irritation. User-dependent behaviors, particularly reusing extensions and inconsistent removal, remain key risk factors. Public health initiatives, particularly via social media, are needed to promote behavior change and safer cosmetic practices.

Key Words Eyelash Extensions, Mascara, Contact Lenses, Ocular Symptoms, Cosmetic Safety, Risk Awareness, Prevention, Saudi Women

INTRODUCTION

The global cosmetic industry has witnessed unprecedented growth in recent years, with eyelash and eyelid enhancements becoming increasingly mainstream [1,2]. While these procedures are primarily sought for aesthetic purposes, their rising popularity has raised critical public health concerns regarding user-dependent safety practices [3,4]. In Saudi Arabia, the cosmetic sector is among the largest in the region, with high consumption rates already documented among university students [5].

Despite increasing use, regulatory oversight remains inconsistent. While the Saudi Food and Drug Authority (SFDA) regulate the safety of cosmetic ingredients [6], the clinical impact of improper consumer practices, such as reusing extensions, remains largely unmonitored [7,8]. Previous local research has established a link between frequent eye cosmetic use and self-reported ocular symptoms, such as dry eye or irritation, among Saudi women [9]. However, a significant gap remains in understanding the relationship between users' risk awareness and their actual behavioral attitudes [10,11].

We hypothesize that despite high reported awareness, unsafe practices remain prevalent due to strong aesthetic motivations. Therefore, this study investigates the knowledge, attitudes and self-reported symptoms associated with eyelash and eyelid cosmetic enhancements among Saudi women, distinctly categorizing risks associated with different products [1,4,12,13]. Findings from this research provide critical insights to guide safer beauty practices in regions where cosmetic enhancements are rapidly expanding.

METHODS

Study Design

A cross-sectional survey was conducted from October 2024 to March 2025. Due to the online recruitment method, a convenience sampling approach was employed, reaching a younger, digitally active demographic. This study was conducted following the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines to ensure transparent and complete reporting [14].

Study Population and Sampling

A minimum of 385 participants was calculated using OpenEpi [15] (95% CI, 5% margin of error).

Inclusion and Exclusion Criteria

Inclusion: Female participants ≥18 years with prior eyelash/eyelid cosmetic use.

Exclusion

Males and individuals <18 years [1].

Data Collection Instrument

The questionnaire was adapted from prior studies [1,3,5], refined through a pilot study with 30 participants and included 30 questions covering demographics, cosmetic usage, health history and risk awareness. Validity was confirmed through the pilot study, ensuring clarity and comprehensibility of all questions.

Data Collection Procedure

The questionnaire was distributed electronically via Google Forms on social media, forums and beauty salons. Participation was voluntary, anonymous and took 10-15 minutes. To prevent multiple submissions by the same participant, Google Forms was set to accept only one response per user.

Statistical Analysis

Data were analyzed using SPSS v27 (IBM Corp., Armonk, NY, USA). Descriptive statistics were calculated for all variables. Associations between cosmetic usage, ocular complaints and awareness were assessed using the Chi-square test. Fisher's exact test was employed when the expected frequency in any cell was less than five. Actual p-values are reported (e.g., $p < 0.001$) to ensure statistical clarity. A p-value <0.05 was considered statistically significant [15].

Ethical Considerations

The study adhered to the Declaration of Helsinki [16] and received approval from the Institutional Review Board of Imam Mohammad Ibn Saud Islamic University (Project number: 771/2025, Date of approval: 12/02/2025). Electronic informed consent was obtained from all participants and data were stored securely.

RESULTS

Participant Characteristics

Table 1 shows a total of 448 participants were included, predominantly aged 18-24 years (77.9%, n = 349), with 71.7% (n = 321) residing in the Central Region. Most participants held a Bachelor's degree (63.2%, n = 283). Cosmetic enhancements were primarily used for aesthetic purposes (93.3%, n = 418), with 75.4% (n = 338) reporting usage durations exceeding three years. Regarding pre-existing ocular health, a significant portion of participants reported having a diagnosed eye disease, with dry eye disease (DED) being the most prevalent condition, reported by 33.5% (n = 150) of the sample. This high prevalence is particularly noteworthy, as it explains the frequent reliance on lubricant eye drops, which were used by nearly half of the participants (49.2%, n = 220). The data suggest that while long-term use of cosmetic enhancements is prevalent, most ocular symptoms remain mild and self-managed, indicating a strong trend toward managing chronic dryness without formal clinical intervention. Furthermore, while systemic diseases were uncommon (13.8%, n = 62), over half of those affected (58.1%, n = 36) were not receiving active treatment. This gap in formal treatment uptake, combined with the preference for over-the-counter lubricants, suggests that users often prioritize immediate symptomatic relief over professional medical consultation, even when dealing with diagnosed chronic conditions.

Eyelash and Eyelid Cosmetic Practices

Most participants, as shown in Table 2, (76.6%, n = 343) reported not following any specific eyelash care routine, indicating that proper maintenance practices are uncommon.

Occasional use of eyelash extensions and eyeliner was reported by 33.7% (n = 151) and 41.7% (n = 187) of participants, respectively, suggesting that intermittent application is more common than regular use. Mascara was used several times per week by 32.6% (n = 146), reflecting consistent cosmetic use among a notable portion of the sample.

Awareness of potential risks varied: 30.1% (n = 135) reported being very aware, while 17% (n = 76) were not aware at all, highlighting a gap in knowledge that could influence safe usage behaviors. Social media was the most common source of information (50.9%, n = 228), underscoring the influence of digital platforms on cosmetic practices.

Regarding future intentions, 39.1% (n = 175) stated they were very unlikely to continue using eyelash extensions, whereas only 9.4% (n = 42) indicated they were very likely to

Table 1: Demographic and clinical characteristics of participants

Variables		n (%)
Age, years	18-24	349 (77.9)
	25-29	29 (6.5)
	30-34	19 (4.2)
	35-39	14 (3.1)
	40-44	17 (3.8)
	45-49	11 (2.5)
	50+	9 (2)
Region	Central Region	321 (71.7)
	Eastern Province	56 (12.5)
	Western Province	39 (8.7)
	Northern Province	23 (5.1)
	Southern Province	9 (2)
Educational level	I don't have an educational qualification	1 (0.2)
	Primary Stage	1 (0.2)
	Intermediate Stage	3 (0.7)
	High School Diploma	134 (29.9)
	Bachelor's Degree	283 (63.2)
	Higher education	26 (5.8)
Which types of cosmetic enhancements do you use?	Contact lenses	4 (0.9)
	Eye Makeup (Mascara, Eyeliner, eyeshadow)	145 (32.4)
	Eyelash extension	8 (1.8)
	Eyelash extension, Contact lenses	4 (0.9)
	Eye Makeup (Mascara, Eyeliner, Eyeshadow), Contact lenses	94 (21)
	Eyelash extension, Eye Makeup (Mascara, Eyeliner, Eyeshadow)	94 (21)
	Eyelash extension, Eye Makeup (Mascara, Eyeliner, Eyeshadow), Contact lenses	99 (22.1)
Reason for using cosmetic enhancements?	Aesthetic enhancement	418 (93.3)
	Hide imperfections of the eyelids and eyelashes	30 (6.7)
How long have you been using these enhancements?	Less than 6 months	16 (3.6)
	6 months to 1 year	25 (5.6)
	1 to 3 years	69 (15.4)
	More than 3 years	338 (75.4)
Do you have any eye diseases?	Blepharitis	10 (2.2)
	Conjunctivitis	4 (0.9)
	Dry eyes	150 (33.5)
	Other	114 (25.5)
	No	170 (37.9)
What ocular medications do you use?	None	170 (37.9)
	Antibiotic eye drops	2 (0.4)
	Eyedrops containing steroid	8 (1.8)
	Redness relief eye drops	8 (1.8)
	Lubricants	220 (49.2)
	Anti allergic eye drops	14 (3.1)
	Other	26 (5.8)
How long have you been affected by this condition?	Don't have any condition	281 (62.7)
	Less than 6 months	95 (21.2)
	6 months to 1 year	35 (7.8)
	1 to 3 years	25 (5.6)
	More than 3 years	12 (2.7)
Do you have any systemic diseases?	No	386 (86.2)
	Asthma	19 (4.2)
	Diabetes	5 (1.1)
	Hypo/Hyperthyroidism	15 (3.3)
	Rheumatoid arthritis	5 (1.1)
	Other	18 (4)
Do you use any treatment for systemic disease?	Yes	26 (41.9)
	No	36 (58.1)

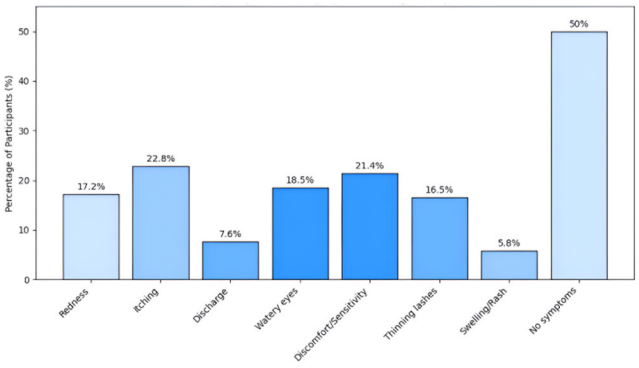

Figure 1: Self-reported ocular complaints (n = 448)

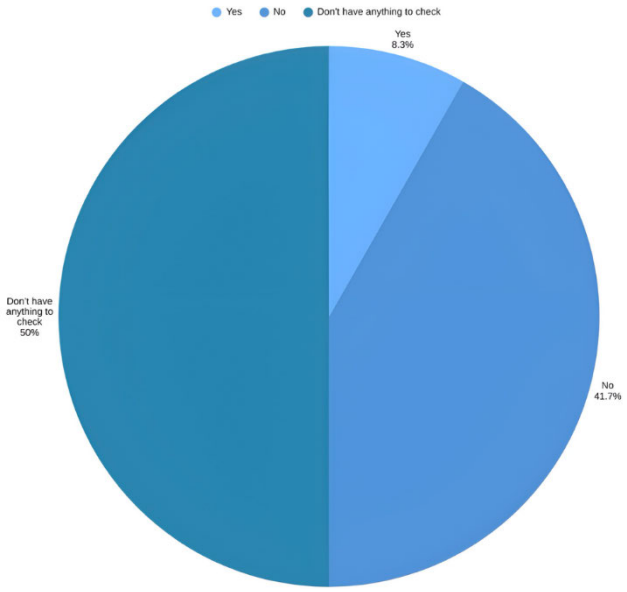

Figure 2: Healthcare-Seeking Behavior Among Participants (N = 448)

continue, suggesting that a substantial proportion may reconsider use after experiencing ocular complaints or gaining awareness of risks.

Ocular Complaints and Healthcare-Seeking Behavior

Half of the participants (50%, n = 224) reported no ocular complaints, indicating that a substantial proportion did not experience noticeable adverse effects. The most frequently reported complaints were itching (22.8%, n = 102), eye discomfort or sensitivity (21.4%, n = 96) and watery eyes (18.5%, n = 83). Thinning or loss of natural lashes was reported by 16.5% (n = 74), highlighting cosmetic-related changes in lash integrity for a subset of users.

Only 8.3% (n = 37) consulted a physician after symptom onset, whereas 41.7% (n = 187) did not seek professional care despite experiencing symptoms, suggesting a preference for self-management or underestimation of symptom severity. These findings are illustrated in Figures 1 and 2.

Table 2: Eyelash and eyelid cosmetic practices, awareness and spending habits among participants

Variables	N (%)
What eyelash care routine do you use?	
Nothing	343 (76.6%)
Eyelash growth serum	46 (10.3%)
Oil (like castor)	18 (4%)
Petroleum jelly (Vaseline)	14 (3.1%)
Eyelash growth serum, Oil (like castor)	9 (2%)
Eyelash growth serum, Petroleum jelly (Vaseline)	8 (1.8%)
Oil (like castor), Petroleum jelly (Vaseline)	6 (1.3%)
Eyelash growth serum, Oil (like castor), Petroleum jelly (Vaseline)	4 (0.9%)
How often do you use the following enhancements? [Eyelash extensions]	
Never	252 (56.3%)
Occasionally	151 (33.7%)
Weekly	15 (3.3%)
Several times a week	21 (4.7%)
Daily	9 (2%)
How often do you use the following enhancements? [Mascara]	
Never	3 (0.7%)
Occasionally	125 (27.9%)
Weekly	86 (19.2%)
Several times a week	146 (32.6%)
Daily	88 (19.6%)
How often do you use the following enhancements? [Eyeliner]	
Never	54 (12.1%)
Occasionally	187 (41.7%)
Weekly	68 (15.2%)
Several times a week	89 (19.8%)
Daily	50 (11.2%)
How long have you been using these enhancements?	
Less than 6 months	16 (3.6%)
6 months to 1 year	25 (5.6%)
1 to 3 years	69 (15.4%)
More than 3 years	338 (75.4%)
Source of eyelash extension?	
Beauty Shops	66 (14.7%)
Drug store/pharmacy	42 (9.4%)
Online retailers	72 (16.1%)
Salon	21 (4.7%)
What type of eyelash extensions do you use?	
Strip lashes	88 (19.6%)
Individual lashes	83 (18.5%)
Magnetic lashes	11 (2.5%)
Semi-Permanent Eyelashes	19 (4.2%)
What type of glue do you use?	
Cyanoacrylate Glue	9 (2%)
Waterproof Glue	34 (7.6%)
Unkown type	155 (34.6%)
Have you ever experienced an allergic reaction to the type of glue you use?	
Yes	25 (5.6%)
No	173 (38.6%)
How do you take off your eyelash extensions?	
Adhesive Remover	36 (8%)
Fall off naturally	18 (4%)
Get professional help	8 (1.8%)
Pull on them	139 (31.1%)
Do you reuse eyelash extension more than the intended use?	
Yes	31 (6.9%)
No	170 (38%)
Do you take off eye makeup, lashes and contact lenses when going to sleep?	
Rarely	6 (1.3%)
Sometimes	40 (8.9%)
Nearly all the time	92 (20.5%)
Always	310 (69.2%)
How much do you typically spend on eyelash cosmetic enhancements each month?	
Don't spend anything	310 (69.2%)
Less than a 100 Riyals	93 (20.8%)
From a 100-150 Riyals	11 (2.5%)

Table 2: Eyelash and eyelid cosmetic practices, awareness and spending habits among participants

From a 150-250 Riyals	21 (4.7%)
More than 250 Riyals	13 (2.9%)
Has your usage of cosmetic enhancements increased or decreased over the past year?	
Decreased	90 (20.1%)
Increased	56 (12.5%)
Stayed the same	302 (67.4%)
Are you aware of potential risks and complications associated with cosmetic enhancements?	
Not aware	76 (17%)
A little aware	117 (26.1%)
Somewhat aware	120 (26.8%)
Very aware	135 (30.1%)
Where did you first hear about the potential risks of eyelash extensions?	
Friends/Family	62 (13.8%)
Social media	228 (50.9%)
Beauty professionals	19 (4.2%)
Healthcare professionals	52 (11.6%)
Other	87 (19.5%)
How likely are you to continue using eyelash extensions in the future?	
Very unlikely	175 (39.1%)
Unlikely	58 (12.9%)
Neutral	102 (22.8%)
Likely	71 (15.8%)
Very likely	42 (9.4%)

Table 3: Association Between Awareness of Cosmetic Enhancement Risks and Reported Ocular Complaints

Complaints		Awareness of potential risks and complications associated with cosmetic enhancements				p-value
		Not aware	A little aware	Somewhat aware	Very aware	
Redness	Yes	8 (10.5%)	28 (23.9%)	18 (15%)	23 (17%)	0.088
	No	68 (89.5%)	89 (76.1%)	102 (85%)	112 (83%)	
Itching	Yes	19 (25%)	28 (23.9%)	29 (24.2%)	26 (19.3%)	0.716
	No	57 (75%)	89 (76.1%)	91 (75.8%)	109 (80.7%)	
Discharge	Yes	8 (10.5%)	9 (7.7%)	7 (5.8%)	10 (7.4%)	0.699
	No	68 (89.5%)	108 (92.3%)	113 (94.2%)	125 (92.6%)	
Watery eyes (increased tearing)	Yes	12 (15.8%)	27 (23.1%)	26 (21.7%)	18 (13.3%)	0.159
	No	64 (84.2%)	91 (76.9%)	94 (78.3%)	117 (86.7%)	
Discomfort or sensitivity in the eye area	Yes	17 (22.4%)	22 (18.8%)	29 (24.2%)	28 (20.7%)	0.784
	No	59 (77.6%)	95 (81.2%)	91 (75.8%)	107 (79.3%)	
Thinning or loss of natural lashes	Yes	13 (17.1%)	15 (12.8%)	25 (20.8%)	21 (15.6%)	0.409
	No	63 (82.9%)	102 (87.2%)	95 (79.2%)	114 (84.4%)	
Swelling or Rash around the eye	Yes	5 (6.6%)	11 (9.4%)	8 (6.7%)	2 (1.5%)	0.054
	No	71 (93.4%)	106 (90.6%)	112 (93.3%)	133 (98.5%)	
Any Complaints	Yes	41 (53.9%)	66 (56.4%)	58 (48.3%)	59 (43.7%)	0.200
	No	35 (46.1%)	51 (43.6%)	62 (51.7%)	76 (56.3%)	

Association Between Awareness of Risks and Ocular Complaints

Table 3 shows no significant associations were observed between awareness levels and specific ocular complaints, including redness (p = 0.088), itching (p = 0.716) and eye discharge (p = 0.699). However, periorbital irritation, swelling or rash around the eye, showed a notable trend toward lower frequency among participants reporting being "very aware" (1.5%, n = 2) compared to those who were "a little aware" (9.4%, n = 11; p = 0.054) suggesting a possible trend toward reduced risk with higher awareness levels.

Participants experiencing any ocular complaints were slightly less prevalent in the "very aware" group compared to the "not aware" group (43.7% vs. 53.9%; p = 0.200), although this difference did not reach statistical significance, highlighting that awareness alone may not consistently translate into protective behaviors.

Impact of Eyelash Extension Reuse on Ocular Complaints

The reuse of eyelash extensions beyond their intended duration was significantly associated with an increased prevalence of several ocular complaints. Participants who reused extensions reported higher rates of redness (38.7%, n = 12 vs. 12.6%, n = 21; p = 0.001), itching (38.7%, n = 12 vs. 21.6%, n = 36; p = 0.041), periorbital irritation, swelling or rash around the eye, : 16.1%, n = 5 vs. 3.6%, n = 6; p = 0.014, discharge (19.4%, n = 6 vs. 7.2%, n = 12; p = 0.030) and watery eyes (32.3%, n = 10 vs. 15%, n = 25; p = 0.020) compared to participants who did not reuse extensions (Table 4).

Furthermore, the overall prevalence of any ocular complaints was significantly higher among participants who reused extensions (80.6%, n = 25 vs. 48.5%, n = 81; p = 0.001), highlighting the substantial impact of extension reuse on ocular surface irritation and the importance of adhering to recommended usage guidelines.

Impact of Pre-Sleep Removal Practices on Eye Health

Participants who rarely removed cosmetic enhancements before sleep showed higher rates of ocular complaints compared to those who consistently removed them (Table 5). Specifically, increased prevalence of itching was observed among participants who rarely removed enhancements (33.3%, n = 2 vs. 20.3%, n = 63; p = 0.040), as well as watery eyes (42.5%, n = 17 vs. 15.8%, n = 49; p = 0.002).

Overall, the presence of any ocular complaint was also more prevalent among participants who rarely removed cosmetic enhancements before sleep (50%, n = 3 vs. 51.9%, n = 161; p = 0.007), suggesting that inadequate removal practices may contribute to ocular surface irritation and symptom development.

Future Use of Extensions

Participants who expressed a high likelihood of continuing to use eyelash extensions in the future ("very likely") reported significantly higher rates of thinning or loss of natural lashes (31%, n = 13 vs. 10.9%, n = 19; p = 0.023). Notably, periorbital irritation, swelling or rash around the eye, also showed a significant association with future intentions, with the highest prevalence observed among those "very likely" to continue use (16.7%, n = 7) compared to only 3.4% (n = 6) in the "very unlikely" group (p = 0.012). No other statistically significant associations were observed for the remaining ocular complaints, suggesting that lash thinning and periorbital irritation are the most noticeable consequences influencing user experience.

Awareness of potential risks showed an inverse relationship with intentions to continue use. Participants who were "very aware" of the associated risks were more likely to report an intention to discontinue eyelash extension use (45.1%, n = 79 "very unlikely" vs. 16.7%, n = 7 "very likely"; p<0.001). In contrast, participants who were "not aware" of potential risks showed a higher tendency toward continued use (31%, n = 13 "very likely"), highlighting the role of risk awareness in shaping future cosmetic behavior.

These findings are summarized in Tables 6 and 7.

Table 4: Association between reuse of eyelash extensions and ocular complaints

Complaints		Reusing eyelash extensions more than the intended use		p-value
		Yes	No	
Redness	Yes	12 (38.7%)	21 (12.6%)	0.001
	No	19 (61.3%)	146 (87.4%)	
Itching	Yes	12 (38.7%)	36 (21.6%)	0.041
	No	19 (61.3%)	131 (78.4%)	
Discharge	Yes	6 (19.4%)	12 (7.2%)	0.030
	No	25 (80.6%)	155 (92.8%)	
Watery eyes (increased tearing)	Yes	10 (32.3%)	25 (15%)	0.020
	No	21 (67.7%)	142 (85%)	
Discomfort or sensitivity in the eye area	Yes	11 (35.5%)	27 (16.2%)	0.012
	No	20 (64.5%)	140 (83.8%)	
Thinning or loss of natural lashes	Yes	6 (19.4%)	35 (21%)	0.840
	No	25 (80.6%)	132 (79%)	
Swelling or Rash around the eye	Yes	5 (16.1%)	6 (3.6%)	0.014
	No	26 (83.9%)	161 (96.4%)	
Any Complaint	Yes	6 (19.4%)	86 (51.5%)	0.001
	No	25 (80.6%)	81 (48.5%)	

DISCUSSION

The present study revealed widespread use of cosmetic enhancements, with self-reported symptoms such as allergic reactions being common. The frequent use of lubricant eye drops suggests a tendency toward self-management of symptoms rather than professional consultation. Statistical analysis confirmed that prolonged reuse of eyelash extensions and infrequent removal before sleep and certain awareness levels were significantly associated with increased ocular complaints including itching and periorbital irritation (p <0.05) [1,2,9].

Our findings align with Albdaya *et al.* [9], who previously established a link between cosmetic frequency and dry eye symptoms in the Saudi population. Aesthetics emerged as the primary motivation for 93.3% of participants [12,13]. The high reliance on social media (50.9%) reflects the digital habits of our younger demographic [5]. Interestingly, while awareness of risks (30.1%) was moderate, ocular complaints remained prevalent. However, our data revealed a significant trend where higher awareness

Table 5: Impact of Makeup, Eyelash and Contact Lens Removal (Safety practice) Before Sleep on Eye Health.

Complaints		Taking off eye makeup, lashes and contact lenses when going to sleep				p-value
		Rarely	Sometimes	Nearly all the time	Always	
Redness	Yes	0 (0%)	9 (22.5%)	10 (10.9%)	58 (18.7%)	0.176
	No	6 (100%)	31 (77.5%)	82 (89.1%)	252 (81.3%)	
Itching	Yes	2 (33.3%)	16 (40%)	21 (22.8%)	63 (20.3%)	0.040
	No	4 (66.7%)	24 (60%)	71 (77.2%)	247 (79.7%)	
Swelling	Yes	1 (16.7%)	1 (2.5%)	4 (4.3%)	10 (3.2%)	0.294
	No	5 (83.3%)	39 (97.5%)	88 (95.7%)	300 (96.8%)	
Rash around the eye	Yes	0 (0%)	1 (2.5%)	3 (3.3%)	6 (1.9%)	0.555
	No	6 (100%)	39 (97.5%)	89 (96.7%)	304 (98.1%)	
Discharge	Yes	0 (0%)	7 (17.5%)	6 (6.5%)	21 (6.8%)	0.144
	No	6 (100%)	33 (82.5%)	86 (93.5%)	289 (93.2%)	
Watery eyes (increased tearing)	Yes	1 (16.7%)	17 (42.5%)	16 (17.4%)	49 (15.8%)	0.002
	No	5 (83.3%)	23 (57.5%)	76 (82.6%)	261 (84.2%)	
Discomfort or sensitivity in the eye area	Yes	2 (33.3%)	14 (35%)	17 (18.5%)	63 (20.3%)	0.116
	No	4 (66.7%)	26 (65%)	75 (81.5%)	247 (79.7%)	
Thinning or loss of natural lashes	Yes	1 (16.7%)	3 (7.5%)	14 (15.2%)	56 (18.1%)	0.344
	No	5 (83.3%)	37 (92.5%)	78 (84.8%)	254 (81.9%)	
Any Complaints	Yes	3 (50%)	10 (25%)	50 (54.3%)	161 (51.9%)	0.007
	No	3 (50%)	30 (75%)	42 (45.7%)	149 (48.1%)	

Table 6: Association Between Future Intentions to Use Eyelash Extensions and Ocular Complaints

Complaints		How likely are you to continue using eyelash extensions in the future?					p-value
		Very unlikely	Unlikely	Neutral	Likely	Very likely	
Redness	Yes	27 (15.4%)	12 (20.7%)	22 (21.6%)	9 (12.7%)	7 (16.7%)	0.515
	No	148 (84.6%)	46 (79.3%)	80 (78.4%)	62 (87.3%)	35 (83.3%)	
Itching	Yes	31 (17.7%)	17 (29.3%)	26 (25.5%)	18 (25.4%)	10 (23.8%)	0.324
	No	144 (82.3%)	41 (70.7%)	76 (74.5%)	53 (74.6%)	2 (76.2%)	
Discharge	Yes	13 (7.4%)	5 (8.6%)	6 (5.9%)	6 (8.5%)	4 (9.5%)	0.893
	No	162 (92.6%)	53(91.4%)	96 (94.1%)	65 (91.5%)	38 (90.5%)	
Watery eyes (increased tearing)	Yes	27 (15.4%)	10 (17.2%)	22 (21.6%)	14 (19.7%)	10 (23.8%)	0.623
	No	148 (84.6%)	48 (82.8%)	80 (78.4%)	57 (80.3%)	32 (76.2%)	
Discomfort or sensitivity in the eye area	Yes	34 (19.4%)	15 (25.9%)	20 (19.6%)	12 (16.9%)	15 (35.7%)	0.123
	No	141 (80.6%)	43 (74.1%)	82 (80.4%)	59 (83.1%)	27 (64.3%)	
Thinning or loss of natural lashes	Yes	19 (10.9%)	9 (15.5%)	20 (19.6%)	13 (18.3%)	13 (31%)	0.023
	No	156 (89.1%)	49 (84.5%)	82 (80.4%)	58 (81.7%)	29 (69%)	
Swelling or Rash around the eye	Yes	6 (3.4%)	3 (94.8%)	6 (5.9%)	4 (5.6%)	7 (16.7%)	0.012
	No	169 (96.6%)	55 (8.6%)	96 (94.1%)	67 (94.4%)	35 (83.3%)	
Any Complications	Yes	95 (54.3%)	30 (51.7%)	50 (49%)	33 (46.5%)	16 (38.1%)	0.393
	No	80 (45.7%)	28 (48.3%)	52 (51%)	38 (53.5%)	26 (61.9%)	

Table 7: Impact of Risk Awareness on the Likelihood of Continued Eyelash Extension Use

Awareness of potential risks and complications associated with cosmetic enhancements	How likely are you to continue using eyelash extensions in the future?					p-value
	Very unlikely	Unlikely	Neutral	Likely	Very likely	
Not aware	26 (14.9%)	7 (12.1%)	13 (12.7%)	17 (23.9%)	13 (31%)	<0.001
A little aware	33 (18.9%)	14 (24.1%)	28 (27.5%)	34 (47.9%)	8 (19%)	
Somewhat aware	37 (21.1%)	24 (41.4%)	3 (32.4%)	12 (16.9%)	14 (33.3%)	
Very aware	79 (45.1%)	13 (22.4%)	28 (27.5%)	8 (11.3%)	7 (16.7%)	

was associated with a reduction in periorbital irritation, swelling or rash around the eye, yet aesthetic desire continued to drive future intentions despite reported symptoms. This highlights a "behavioral gap" where awareness does not necessarily drive preventive practices when aesthetic desire is the primary motivator.

Ocular surface irritation symptoms such as itching (22.8%) align with broader trends [8]. It is important to note that these symptoms were mostly mild, which may explain the low healthcare-seeking behavior (8.3%) observed in this cohort [3].

Notably, participants who intended to continue eyelash use reported significantly higher rates of lash thinning and periorbital irritation, suggesting a high tolerance for complaints in favor of aesthetic outcomes.

Strengths of this study include its large sample size and the detailed examination of user practices, such as reuse and removal habits, in relation to ocular symptoms. It also uniquely highlights the gap between risk awareness and the persistence of cosmetic use despite complications. However, limitations include the online convenience sampling, reliance on self-reported non-clinically verified data and an age-restricted sample, which may introduce selection and recall bias.

CONCLUSIONS

Eyelash and eyelid cosmetic enhancements are widely used among the studied population of young Saudi women. User-dependent behaviors, particularly reusing extensions and inconsistent removal, are strongly linked to preventable ocular surface complaints. While moderate risk awareness showed a potential trend in reducing certain complaints like periorbital irritation, it did not consistently translate into professional healthcare-seeking behavior, likely due to the mild nature of the reported symptoms. To bridge this gap, targeted educational campaigns should be integrated into social media platforms, focusing on practical hygiene protocols and the importance of professional consultation when symptoms persist. Furthermore, there is a need for clearer regulatory guidelines regarding product labeling and salon safety standards to ensure user safety and informed consumer choices. [5,6].

Ethical Statement

The study adhered to the Declaration of Helsinki [16] and was approved by the Institutional Review Board of Imam Mohammad Ibn Saud Islamic University (Project number: 771/2025; Date of approval: 12/02/2025). All participants provided electronic informed consent prior to participation and all data were stored securely in compliance with institutional regulations and privacy standards.

The data supporting the findings of this study are included within the manuscript tables and supplementary materials. Additional de-identified data that support the results of this study are available from the corresponding author upon reasonable request, in accordance with ethical and privacy considerations.

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