ORIGINAL ARTICLE

ASSOCIATION OF DRY EYES WITH TYPE AND DEMOGRAPHICS OF EYE COSMETICS USERS

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Background: Eye makeup is applied to make the eyes attractive, improving self-confidence and personal appearance. However, their regular use might be harmful effects to the eyes. This research was done to report the frequency of dry eyes (DEs) among eye cosmetic users and to find association of severity of DE with type of cosmetics and demographics of these patients. **Methods:** It was a cross sectional study conducted on 141 female patients attending eye OPD of Ayub Teaching Hospital Abbottabad with symptoms suggestive of dryness of eyes. All these women were using different types of eye cosmetics and had no previous history of dry eyes. Ophthalmic examination was performed by a single Eye specialist for confirmation of diagnosis of dry eyes in these women according to Japanese diagnostic criteria. Data was collected on a predesigned structured questionnaire and analyzed on SPSS-23. **Results:** A total of 83(58.9%) women had DEs among 141 female eye cosmetics users. Mild dryness was present in 3(2.1%), moderate in 16(11.3%) and severe in 65(45.4%). DEs was associated with age (p<0.001), occupation (p<0.001), type of eye make-up used (p<0.001), duration of application (p 0.009), frequency of eye make-up usage (p 0.05), cleanser usage (p 0.009) and removal before sleeping (p 0.005). **Conclusion:** DEs was quite common among eye cosmetic users in our set up and severe dryness being most frequent. It was associated with multiple demographic and eye cosmetics related variables.

Keywords: Dry Eyes; Cosmetics; dryness; redness

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INTRODUCTION

Dry Eyes (DEs) is one of the most globally prevalent eye conditions of multifactorial origin. Around the globe, its prevalence ranges from 5%–50% according to geographic location.[1] In Saudi Arabia it was about 32.1%[2] while in Pakistan it was 18.7%[3].

The DEs mainly occurs due to either increased evaporation or decreased production of tears with changes in tear osmolality resulting in eye discomfort.[4] Ocular symptoms of DEs include redness, dryness, discomfort or pain, itching, burning, irritation, photophobia and grittiness.[5]

Eye Cosmetics such as eye liner, eye shadow and mascara are commonly used by females since ancient times as early as 10,000 BC for aesthetic purposes and to improve their personal appearance.[6] Although eye cosmetics are considered as safe for use on human eyes, however their regular use may result in ocular discomfort like dry eyes and corneal irritation.

Many factors for Des have been identified in previous researches like age, female gender, Asian ethnicity, exposure to environmental pollutants, autoimmune and allergic diseases, hormonal disbalance, psychiatric diseases, certain medicines, contact lenses and refractive errors etc.[7] Recently use of eye cosmetics was also identified as a risk factor for DEs.[8,9] Dry eyes' symptoms if left unmanaged can result in grave complications and ultimately can affect the quality of life.[10]

Globally, literature on this subject is scarce and to the best of researcher's knowledge, no data is available about the dry eyes and use of eye cosmetics in Pakistan. Hence it has become substantially important to conduct research on this novel aspect of dry eyes. Therefore, the objective of this research was to determine the frequency of DEs among females using various eye cosmetics so as to build the local evidence for the ophthalmologists for evidence based management of DE in future and creating awareness among the females regarding use of eye cosmetics.

MATERIAL AND METHODS

This cross sectional study was conducted after fulfilling the codal formalities of consent and

ethical committee approval. All the regular eye cosmetics user 141 females of 24–44 years age group presenting with any two of the following symptoms (burning, redness, watering, foreign body sensation, grittiness, photophobia) for at least 1 month were selected through consecutive sampling from the eye OPD. Sample size was calculated by WHO software based on the following assumptions: 95% CI, 71.6% anticipated proportion of dry eyes in eye cosmetic users[2], 7.5% absolute proportion.

Regular use was described as eye make-up use of >3 times per week for at least one year. Those having history of any systemic disease or previous eye surgery, pregnancy or using eye drops were excluded. Basic socio-demographics characteristics of all the patients were also recorded.

The diagnosis was made according to Japanese Diagnostic Criteria for dry eyes.[11] It included score of more than 6 on dry eye questionnaire (DEQ-5) along with presence of any two of the following signs like tear film breakup time (TBUT) of ≤10 seconds in either eyes, Schirmer's test (ST) ≤5 mm in 5 minutes, corneal fluorescein staining (CFS) score of ≥1 and presence of conjunctival injection, punctate epithelial erosions (PEE) and slit lamp examination for meibomian gland dysfunction (MGD). All of these tests were performed under the same physical conditions by a single consultant ophthalmologist. The severity of dry eyes was assessed on the basis of Dry eye symptom severity scale.[12] The DE severity score of 3–4 was labeled as mild, 5–6 as moderate and above 7 as severe DED. All the information was gathered on a predesigned structured proforma which consisted of demographic variables and questions about type of eye make-up used, frequency and duration of use, removal before sleeping and method for removal. The data was analyzed by SPSS-23.

RESULTS

The mean age of 141 eye cosmetic users was 31.9±5.75years and mean duration of cosmetics used over the eyes was 6.2±0.21hrs. The majority of females 92(65.2%) were of young age group (24–33y) and most of the women 119 (84.4%) were professional. Out of the professional women, majority were teachers 37 (26.2%). Most women were applying eye makeup 84 (59.6%) for 3–4 days/week and 69 (48.9%) for >6 hrs/day. About 90 (63.8%) used baby oil or cleansing wipes for eye make-up removal while rest of the women used just plain soap and water. The types of eye cosmetics used by the patients were mascara only by 66 (46.8%), eye shadow only by 27 (19.1%), eye liner only by 33 (23.4%) and more than one type by 15 (10.6%) females.

Out of 141 eye cosmetic users, about 83 (58.9%) women had DEs. Among these women 64 (45.4%) had severe dry eye disease. Details are illustrated in Table-1. Regarding severity, severe dryness was most frequent among 33–44years age group females 33 (67.3%), postgraduate trainees 24 (82.8%), mascara users 38 (57.6%), those using for 5–7 days/week 33 (57.9%) and using for 4–6 hrs./day 24 (54.5%).

Findings regarding significance of association of DEs with demographics (age and occupation) of patients with *p* values are shown in Table-2.

DEs was also found to be significantly associated with duration of application of eye cosmetics, type of eye make-up used, frequency of eye make-up usage and cleanser used for removal and removal before sleeping as illustrates in Table-3.

Table-1: Frequency of Dry Eyes in Eye cosmetics users (n=141)

Variables	Categories	Frequency(%age)		
Dry Eye Disease	Present	83(58.9%)	mild	3(2.1%)
			moderate	16(11.3%)
			severe	65(45.4%)
	Absent	58(41.1%)		

Table-II: Association of Dry Eyes with demographics

Variable	Categories	f (%age) n=141	Dry Eye		*p*-value
			absent	present	
Age	24–33 years	92(65.2%)	48(52.2%)	44(47.8%)	<0.001*
	34–44 years	49(34.8%)	10(20.4%)	39(79.6%)	
Occupation	teacher	37(26.2%)	17(45.9%)	20(54.1%)	<0.001*
	postgraduate	29(20.5 %)	5(17.2%)	24(82.8%)	
	Computer user	30(21 %)	7(23.3%)	23(76.7%)	
	Office worker	23(16.3%)	1(4.3%)	22(95.7%)	
	Non-professional	22(15.6%)	5(22.7%)	17(77.3%)	

Table-3: Association of Dry eye disease with usage and type of eye cosmetics

Variable	Categories	f(%age) n=141	Dry Eye		*p*-value
			absent	present	
Eye make-up usage	3-4days/week	84(59.6%)	40(47.6%)	44(52.4%)	0.05*
	5-7days/week	57(40.4%)	18(31.6%)	39(68.4%)	
Duration of use	≤3hrs	28(19.9%)	17(60.7%)	11(39.3%)	0.009*
	4-6 hrs	44(31.2%)	11(25.0%)	33(75.0%)	
	>6hrs	69(48.9%)	30(43.5%)	39(56.5%)	
Type of cosmetic	Mascara only	66(46.8%)	9(13.6%)	57(86.4%)	<0.001*
	Eye-shadow only	27(19.1%)	20(74.1%)	7(25.9%)	
	Eye liner only	33(23.4%)	29(87.9%)	4(12.1%)	
	> 1 or above	15(10.6%)	0(0.0%)	15(100.0%)	
Method of cleansing	Baby oil/wipes	90(63.8%)	46(51.1%)	44(48.9%)	0.001*
	Soap and water	51(36.2%)	12(23.5%)	39(76.5%)	
Removal before sleep	Yes	113(80.1%)	5(17.9%)	23(82.1%)	0.005*
	No	28(19.9%)	53(46.9%)	60(53.1%)	

DISCUSSION

Dry Eyes is a disorder of the tears and ocular surface that results in eye discomfort and visual disturbance. It is multifactorial in origin and can affect the daily routine activities. It can significantly impact the quality of life and productivity. This study examined the frequency and severity of dry eyes (DEs) among 141 female eye cosmetic users. The mean age of participants was 31.9±5.75years so the majority being young professionals ladies.

Notably, 83 (58.9%) had DEs on examination. Out of these, 65 (45.4%) were suffering from severe disease. The results are in alignment with a study conducted by Albdaya *et al* who also reported a high frequency of DEs in cosmetic users.[2] Similarly, in a study among university students in Poland by Wróbel-Dudzińska *et al.*[1], a high prevalence of DEs was found. It is in line with the results of our study in which DE were more frequent in the postgraduate students. Another study by Wang MT also supports the frequent occurrence of DEs among the eye cosmetic users.[13]

Among the demographics, age and occupation were studied. DEs was more common in the older age group which is similar to another study showing older age and had higher DEs prevalence.[14] These demographic risk factors were also significantly associated with DEs in this study (p<0.001 for both). These results are augmented by the study of Albdaya *et al*[2] and Aziz B *et al*[15] who also found significant association of age and profession with DEs.

This study also revealed that the type, frequency and duration of eye cosmetic use were strongly associated with DEs. Women, who applied mascara or combination of eye cosmetics, used them for more days per week and for longer daily durations had higher rates of DEs. Similarly, individuals who used cosmetics 5–7 days per week or for 4-6 hours daily exhibited a higher prevalence of DEs. Similar findings were reported in a study conducted in Saudi Arabia study[2] however, no association was found between frequency of eye cosmetics use and DEs.[8]

Additionally, most of the participants who were poor in hygiene and management while handling their eye cosmetic had increased dry eye frequency, especially those who did not remove eye cosmetics before sleeping and did not use cleanser for wiping off the make-up from their eyes, influenced DEs prevalence. These findings align with Albdaya *et al* study and another study highlighting the importance of hygiene while using eye cosmetics.[2,16]

Limitations

Certain limitations of this research should be considered when interpreting the results. Sample size was relatively small limiting the generalizability of the findings to broader populations. Much data regarding the frequency, duration, and type of eye cosmetic use, as well as the methods of removal, were self-reported by the participants that can result in recall bias or inaccuracies in reporting. As it was hospital based study conducted in a single geographic location so the findings might not be applicable to populations in other regions with different environmental conditions and eye cosmetic use habits.

CONCLUSION

Based on the results, it is concluded that DEs is a relatively common issue among the eye cosmetic users in our set up. The association between DEs and eye cosmetics use is multifaceted and influenced by factors including the age, occupation frequency, duration, and type of cosmetics used, method of removal as well as removal before sleeping. These observations underscore the significance of cautious use of eye cosmetics to mitigate the risk of developing DEs. Eye cosmetic users should be made aware of the potential risks associated with their prolonged and frequent use so that appropriate makeup removal

techniques may be adopted by them to maintain their ocular health and prevent DEs and its complications.

AUTHORS' CONTRIBUTION

AZK, BA, UB: Concept, write-up, proof reading. BM, QMUH, AS: Literature search, data collection, data analysis, interpretation.

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