Research Article
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Association of dry eye disease in patients using antidepressants

Abstract

Purpose: The purpose of this study was to determine the association of dry eye disease in patients using antidepressants and also comparison of two antidepressants drugs escitalopram and sertraline among patients using these anti-depressants drugs.

Methods: This descriptive cross sectional study was done from July 2019 to April 2020 at Capital Development Hospital Islamabad and Benazir Bhutto Hospital Rawalpindi. Data was gathered by using self-made proforma. Purposive sampling was done. After taking consent from the individuals using these two antidepressants Schirmer test and Ocular surface disease index results were recorded. Data analysis was done by the latest SPSS version 20. Data was analyzed by using chi square in SPSS version 20.

Result: In 80 subjects aged between 20-40 years, both male and female gender using antidepressants escitalopram and sertraline, association of dry eye was assessed by Schirmer test and ocular surface disease index. Results of this study showed that dry eye was associated with duration of usage of antidepressants ($p<0.001$). Statistically there is no significant difference of dry eye between escitalopram and sertraline with p value (0.488).

Conclusions: This study gives knowledge to Ophthalmologists and health care practitioners that long term use of antidepressants has association with dry eye. Antidepressant drug dosage history is important in dry eye disease. Dry eyes were checked in patients using these two drugs escitalopram, sertraline.

Keywords: antidepressants, dry eye, schirmer test, ocular surface disease index, escitalopram and sertraline.

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Introduction

The cornea, a transparent dome-shaped structure, is the most powerful refractive component of the eye, contributing two-thirds of its total focusing power.[1] It consists of five main layers: the epithelium, Bowman's layer, stroma, Descemet's membrane, and the endothelium. Each layer plays a critical role in maintaining the optical clarity and biomechanical stability necessary for vision.

The cornea is protected by the tear film, a multi-layered fluid that covers the ocular surface and contributes to a smooth optical surface, protection from infection, and nutrient exchange. The tear film consists of three layers: the outer lipid layer, the middle aqueous layer, and the inner mucin layer, each performing essential tasks in preserving corneal health.[2]

Dry eye disease (DED) is a multifactorial disease of the ocular surface, characterized by a loss of tear film homeostasis of the tear film, accompanied by ocular symptoms. It may involve tear film instability, hyperosmolarity, inflammation, and neurosensory abnormalities.[3] DED is primarily classified into two types: aqueous-deficient and evaporative. Common symptoms such as itching, burning, dryness, and photophobia can significantly impact visual function and reduce quality of life.

Among the causes of dry eye, drug-induced ocular side effects have gained increasing attention. In particular, selective serotonin reuptake inhibitors (SSRIs) a widely prescribed class of antidepressants are known to affect tear production by altering neurotransmitter activity.[4] These medications can interfere with the autonomic regulation of the lacrimal gland, resulting in reduced tear secretion and compromised tear film stability.

Escitalopram and sertraline are two commonly prescribed SSRIs. While both are effective in treating mood disorders, they differ in their pharmacological properties: escitalopram is highly selective for serotonin reuptake inhibition, whereas sertraline also exhibits mild dopaminergic activity. These pharmacological differences may affect tear film integrity and lead to varying degrees of dry eye symptoms.

Given the increasing use of SSRIs and the frequent complaints of dry eye among users, this study aims to evaluate the presence and severity of dry eye disease in individuals taking escitalopram and sertraline. The findings may help eye care professionals better understand SSRI-related ocular surface complications and foster collaboration with mental health providers for improved patient care.

Materials and methods

This descriptive cross-sectional study was conducted over nine months, from July 2019 to April 2020, at two government hospitals: Capital Development Hospital, Islamabad, and Benazir Bhutto Hospital, Rawalpindi. A total of 80 patients aged 20 to 40 years, diagnosed with moderate depression and undergoing treatment with either escitalopram or sertraline, were selected through purposive sampling. Informed consent was obtained from all participants prior to enrollment.

Patients were excluded if they had any ocular surface disease other than dry eye, were long-term contact lens users, smokers, or had systemic conditions that could induce dry eye symptoms (e.g., renal insufficiency). Additional exclusion criteria included the use of other xerogenic medications, prolonged computer use, or a history of anterior or posterior eye surgery.

Data were collected using a custom-designed data collection form developed by the researchers to record demographic and clinical information.

To assess dry eye disease, two validated tools were employed:

a) Schirmer's Test: Tear production was measured using 5 mm × 35 mm sterile filter paper strips. The strips were placed in the lower conjunctival sac without anesthesia for five minutes, and the wetting length was recorded in millimeters.

b) Ocular Surface Disease Index (OSDI): A standardized 12-item questionnaire was used to evaluate the frequency of dry eye symptoms, their impact on visual function, and environmental triggers. OSDI scores were calculated using the formula:

$$\mathbf{OSDI} = \frac{sumofscores \times 25}{Numbero = fquestionsanswered} \quad (1)$$

Scores were categorized as follows:

1) Normal: 0–12
2) Mild DED: 13–22
3) Moderate DED: 23–32
4) Severe DED: 33–100

All collected data were statistically analyzed using SPSS version 20. The Chi-square test was applied to assess associations between categorical variables, and a p-value < 0.05 was considered statistically significant.

Results

A total of 80 patients using the antidepressants escitalopram and sertraline were included in the study. The association between dry eye and the use of these antidepressants was evaluated using the Schirmer test and the Ocular Surface Disease Index (OSDI) in patients aged 20 to 40 years. A comparison was also made between the two drugs regarding their potential to cause dry eye (Table 1).

Table 1 Cross tabulation of ocular surface disease index of escitalopram and sertraline

		Schirmer test				Total	P value
		Normal	Mild	Moderate	Severe		
Type of drug	Escitalopram	28	10	7	4	49	0.445
		57.10%	20.40%	14.30%	8.20%	100.00%	
	Sertraline	19	8	1	3	31	
		61.30%	25.80%	3.20%	9.70%	100.00%	

This showed the association of antidepressants drug escitalopram and sertraline with Schirmer test. 57.1% of escitalopram users and 61.3% sertraline users showed normal schirmer test value had healthy normal eyes. The Chi-Square test was applied. The results showed that there is statistically non-significant difference (p=0.445) between both drugs (Table 2).

Table 2 Cross tabulation of ocular surface disease index of escitalopram and sertraline

		Ocular surface disease index				Total	P value
		0 to 25	26-50	51-75	76-100	49	
Type of drug	Escitalopram	57.10%	28.60%	8.20%	6.10%	100.00%	0.431
	Sertraline	20	7	4	0	31	
		64.50%	22.60%	12.90%	0.00%	100.00%	

This showed the association of the type of drug escitalopram and sertraline with OSDI. The Chi-Square test was applied. Results showed that by Ocular Surface Disease Index value and by usage of a type of drug dry eye is present. The results showed that there is statistically non-significant difference (p=0.431) in both drugs (Table 3).

Table 3 Cross tabulation of schirmer test vs duration of drug

		Schirmer test				Total	P value
		Normal	Mild	Moderate	Severe		
Duration of drug usage	One to six months	11	0	0	0	11	<0.001
		100.00%	0.00%	0.00%	0.00%	100.00%	
	Seven to twelve months	23	4	1	0	28	
		82.10%	14.30%	3.60%	0.00%	100.00%	
	Thirteen to eighteen months	13	5	2	4	24	
		54.20%	20.80%	8.30%	16.70%	100.00%	
	Nineteen to twenty four months	0	9	5	3	17	

This showed that anti-depressants patients having drug dosage history of one to six months have normal schirmer test values. But with the time usage of antidepressants will increase the dry eye. The Chi-Square test was applied. Results show that dry eye is present as duration of drug usage increases. The results showed that there is a statistically marked significant difference (p<0.001) (Figure 1).

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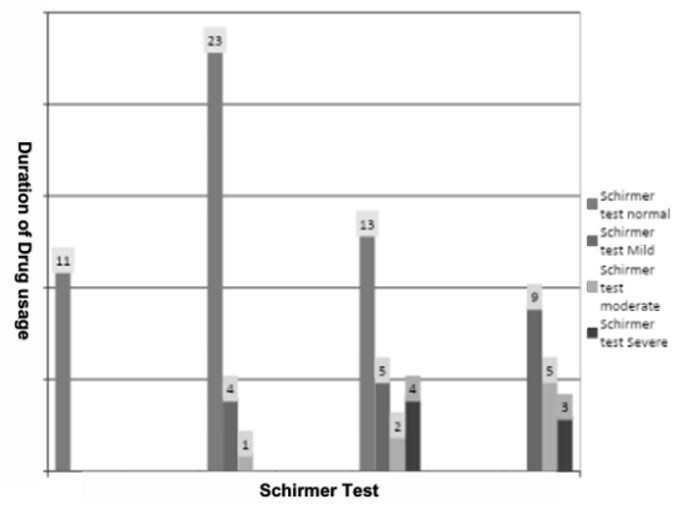

Figure 1 Bar graph of schirmer test vs duration of drug usage.

Graph shows that the duration of drug dosage increases after seven months there are more chances of dry eye disease.

This table shows the subjects who have been using drugs for 1-6 months showed Ocular Surface Disease Index but with passage of time dry eye cases increase. The Chi-Square test was applied. The results showed that there is a statistically marked significant difference ($p < 0.001$) (Table 4) (Figure 2).

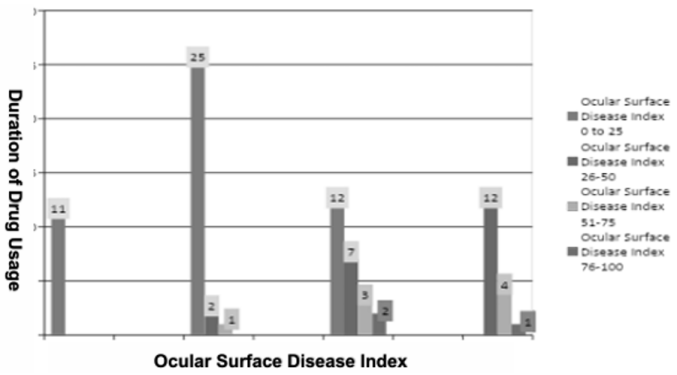

Figure 2 Bar graph of ocular surface disease index vs duration of drug usage.

Table 4 Cross-tabulation of ocular surface disease index vs duration of drug usage

		Ocular surface disease index				Total	P value
		0 to 25	26-50	51-75	76-100		
Duration of drug usage	One to six months	11	0	0	0	11	<0.001
		100.00%	0.00%	0.00%	0.00%	100.00%	
	seven to twelve months	25	2	1	0	28	
		89.30%	7.10%	3.60%	0.00%	100.00%	
	thirteen to eighteen months	12	7	3	2	24	
		50.00%	29.20%	12.50%	8.30%	100.00%	
	Nineteen to twenty four months	0	12	4	1	17	

Discussion

This study was conducted to evaluate the presence and severity of dry eye disease (DED) in patients using the antidepressants escitalopram and sertraline. The findings revealed a strong association between the duration of antidepressant use and the occurrence of dry eye symptoms. Patients using these medications for longer periods exhibited more signs of moderate to severe dry eye, as assessed by the Schirmer test and the Ocular Surface Disease Index (OSDI).

These results align with previous studies that have identified antidepressants, particularly SSRIs, as potential contributors to reduced tear secretion and tear film instability.[5] However, when comparing escitalopram and sertraline, no statistically significant difference in the severity of dry eye symptoms was observed. Interestingly, a slight subjective trend suggested that patients on sertraline experienced comparatively higher discomfort. This may be due to differences in pharmacodynamic profiles, as sertraline could have broader effects on neurotransmitter pathways involved in tear film regulation. Literature on SSRIs has shown variability in ocular side effects among different agents, supporting this observation.[6]

The significance of these findings lies in their clinical implications. Mental health professionals and ophthalmologists should be aware of the possible ocular side effects associated with prolonged SSRI use. Patients may not naturally connect symptoms like eye dryness to their antidepressant therapy, which could lead to underdiagnosis or mistreatment. Including ocular history and screening for DED in patients undergoing long-term antidepressant treatment may help improve patient comfort, treatment adherence, and overall quality of life.[7]

Furthermore, the study emphasizes the importance of interdisciplinary care. Educating patients about potential ocular side effects and encouraging regular eye examinations can play a preventive role in minimizing long- term complications. While the duration of medication use was found to be a relevant factor, its detailed implications on DED progression warrant further study.

Escitalopram and sertraline were selected due to their widespread use in clinical psychiatric practice, making them relevant choices for assessing DED in commonly treated populations. However, the study has its limitations, including a modest sample size and data collection from only two government hospitals, which may restrict generalizability.

Conclusion

This study provides useful insights into the association between long-term antidepressant use and dry eye disease. While no statistically significant difference was found between escitalopram and sertraline, sertraline users reported slightly more discomfort, potentially

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indicating a subjective variance. The duration of medication use appears to be an important factor in DED severity. Future research with larger, multi-center samples and inclusion of patient-reported symptoms and ocular examinations over time is recommended to better understand the ocular effects of individual antidepressants.

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Conflict of interests

The author declares no potential conflicts of interest with respect to the research, authorship, or publication of this article.

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