



A RETROSPECTIVE ANALYTICAL STUDY TO EVALUATE THE ASSOCIATION BETWEEN DRY EYE DISEASE AND EACH OF DEPRESSION, ANXIETY AND RHEUMATOID ARTHRITIS

Ophthalmology

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ABSTRACT

Aim: This study was carried out to investigate the associations between dry eye disease and each of depression, anxiety and rheumatoid arthritis. It was a retrospective, analytical study conducted on 100 patients in Out Patient Department over the age of 18 years old examined between September 2016 and April 2017.

Method & Result: The data collected in form of questionnaires and slit lamp examination was compiled and subjected to statistical analysis. The estimated odds ratio, 95% confidence interval and p-value between dry eye and each of anxiety, depression and rheumatoid arthritis was calculated.

Conclusion: Statistically significant associations between dry eye disease and each of depression, anxiety and rheumatoid arthritis were identified.

KEYWORDS:

dry eye, anxiety, depression, rheumatoid arthritis

INTRODUCTION

Dry eye is a disorder of the ocular surface due to insufficient secretion of aqueous tears and/or excessive tear evaporation and is characterized by instability and hyperosmolarity of tear film leading to inflammation of the ocular surface. (1) It is a multifactorial disease of the tear film and ocular surface that results in symptoms of discomfort, visual disturbance, and tears film instability with potential damage to the ocular surface. (1) It remains a largely symptomatic diagnosis, without a single defining diagnostic test. (1) Several population-based studies have reported the prevalence of dry eye, with quoted prevalence rates ranging from 5.5% to 33.7%. Other researchers differ in their opinion and argue that the true prevalence is considerably higher. (2-9) Nevertheless, there is little question that dry eye remains a common and complex problem for health care providers. In addition, dry eye is associated with other ocular and systemic illnesses. Sjogren's syndrome, for example, is an autoimmune disease, which has as part of its diagnostic criteria the presence of dry eye. Rheumatoid Arthritis and dry eye are related to each other as well. (10, 11) In recent years, dry eye disease has become an extremely common condition that causes varying degrees of ocular discomfort and disability. (3, 7, 12, 13, 14) Many etiological factors for dry eye have been proposed. Older age and female gender have been identified as risk factors for dry eye. (3, 7, 15).

In this study we tried to find if there is any statistically significant association between dry eye disease and each of anxiety, depression and rheumatoid arthritis.

METHOD

The study was carried out at Rajindra hospital, Patiala between September 2016 and April 2017. Our study population included patients over the age of 18 years old at the time of examination presenting in Out Patient Departments of Ophthalmology, Psychiatry, Medicine and Orthopedics.

Dry eye was diagnosed on the basis of presence of:

- 1) One or more symptoms occurring often or most of the time,
- 2) One or more of the following signs:
 - a) tear film break up time ≤ 10 seconds,
 - b) fluorescein corneal staining $\geq$ grade 1
 - c) Schirmer test score ≤ 5 mm.

Odds ratios were separately estimated between dry eye and each of the other diseases. We used separate logistic regression models to estimate associational odds ratios, each adjusted for age group and gender, along with 95% confidence intervals aggregated by gender and age group, with age groups pre-defined as 18 to 35 years, 36 to 50 years, 51 to 65 years, and older than 65 years. These age groups were defined prior to the data analysis. To explore the potential for differential associations across age groups, we fit additional models that included disease-by-age-group interactions. We report 95% confidence

intervals for the associations within each of these age groups along with a test of the interaction term for comparing associations across age groups.

FIGURES AND TABLES

A total of 100 patients (Male-58, Female-42) from Out Patient Department of Ophthalmology, Psychiatry, Medicine and Orthopaedics were included in the analysis; Of the 100 patients, there were 23 (14 Male+9 Female) patients with dry eye, 23 (13 Male+10 Female) patients with anxiety, 40 (21 Male+19 Female) patients with depression and 14 (10 Male+4 Female) patients with Rheumatoid Arthritis.

Table 1 summarizes the aggregated data.

Table 2 presents the prevalence of dry eye in patients with and without each of depression, anxiety and rheumatoid arthritis respectively.

Table 3 shows the estimated odds ratio between dry eye disease and anxiety was 1.43, with a 95% confidence interval of (0.11, 1.79). The estimated odds ratio between dry eye disease and depression was 1.29, with a 95% confidence interval of (0.48, 1.42). The estimated odds ratio between dry eye disease and rheumatoid arthritis was 0.97, with a 95% confidence interval of (0.50, 1.40).

Table 4 shows age adjusted odds ratio, 95% confidence interval and p-value for Dry eye with each of depression, anxiety and rheumatoid arthritis. It clearly shows evidence that these associations differed across age groups. Notably, there was a greater association with dry eye and rheumatoid arthritis in the youngest age group compared to the older age groups. The p-value was significant for each of the association between dry eye disease with each of depression (0.002), anxiety (0.048) and rheumatoid arthritis (0.026).

Table 1: The compiled aggregate data collected.

Gender	Age Group (In Years)	Total	With Dry Eye	With Anxiety	With Depression	With Rheumatoid Arthritis
Female	18-35	07	01	02	03	01
	36-50	16	04	04	05	03
	51-65	21	06	04	07	04
	>65	14	03	03	06	02
Male	18-35	04	01	01	02	00
	36-50	11	02	03	05	01
	51-65	17	04	04	07	02
	>65	10	02	02	05	01

Table2: Estimated prevalence of dry eye in patients with or without each of depression, anxiety and rheumatoid arthritis

	With Dry Eye	Without Dry Eye	Total
With Anxiety	3 (13.04%)	20 (86.96%)	23
Without Anxiety	20 (25.97%)	57 (74.03%)	77
With Depression	4 (10.00%)	36 (90.00%)	40
Without Depression	19 (31.67%)	41 (68.33%)	60
With Rheumatoid Arthritis	2 (13.33%)	13 (86.67%)	15
Without Rheumatoid Arthritis	21 (24.71%)	64 (75.29%)	85
Total	23 (23.00%)	77 (77.00%)	100

Table3: Estimated odds ratios and 95% Confidence Interval between dry eye disease and each of depression, anxiety and rheumatoid arthritis

Disease	Adjusted Odds Ratio*	95% Confidence Interval
Anxiety	1.43	(0.11, 1.79)
Depression	1.29	(0.48, 1.42)
Rheumatoid Arthritis	0.97	(0.50, 1.40)

Table 4: Age adjusted odds ratio,95% Confidence Interval and p value for Dry eye with each of depression, anxiety and rheumatoid arthritis

Disease	Age Group	Adjusted Odds Ratio	95% Confidence Interval	p value
Anxiety	18-35	1.39	(1.07, 2.40)	0.048
	36-50	2.02	(1.02, 2.29)	
	51-65	2.59	(1.19, 3.03)	
	>65	3.77	(1.39, 4.74)	
Depression	18-35	1.50	(0.81, 2.18)	0.002
	36-50	2.26	(0.98, 2.29)	
	51-65	2.72	(2.28, 3.15)	
	>65	2.90	(1.19, 3.17)	
Rheumatoid Arthritis	18-35	1.59	(1.36, 1.87)	0.026
	36-50	2.77	(1.28, 3.40)	
	51-65	1.36	(0.68, 2.51)	
	>65	1.09	(0.82, 1.72)	

DISCUSSION

The Beijing Eye Study(2013) conducted by Labbe A, Wang YX, Jie Y, Baudouin C, Jonas JB, Xu L. identified an association between dry eye disease and depression symptoms in an elderly population in Beijing.(16)

A study by Wen et al (2012) observed an increased frequency of dry eye disease in 472 psychiatric patients being treated for a variety of psychiatric illnesses, including depression and anxiety.(17)

Another study conducted by Galor et al (2011) demonstrated an association between dry eye disease and post traumatic stress disorder as well as depression in a veterans population.(18) The purpose of this study was to investigate the association between dry eye disease and depression, anxiety and Rheumatoid Arthritis.(18)

A study carried out by van der Vaart et al identified a statistically significant association between dry eye disease and each of depression and anxiety. (19)

Kim et al in their study demonstrated association of depression with DED symptoms in subjects with normal or mildly reduced tear production. (20)

Michael A.Lemp in his study quoted that initiating factors for dry eye include a diverse group of abnormalities including systemic autoimmune disease, hormonal changes, neurologic lesions, age-related changes in apoptotic cellular death, and iatrogenic and workplace-related causes.(10)

A study by Fujita M et al concluded that dry eye is common in RA patients, including those without SS.Dry eye always should be taken into consideration regardless of the RA activity, because the severity of dry eye is independent of RA activity.(11)

Multivariate analyses revealed that depression is an independent risk factor for DED. Several mechanisms may underlie the association

between depression and dry eye symptoms, although they are unclear and yet to be determined. First, the two diseases may have common pathophysiology. The two diseases have common risk factors including female sex and menopause, suggesting the involvement of sex hormones in both diseases.(3,7,15,23,24) In addition, inflammation plays a crucial role in the development of DED (25) and the anti-inflammatory potential of omega-3 polyunsaturated fatty acids (PUFAs) has been shown to be helpful in alleviating dry eye signs and symptoms.(26) Interestingly, many researchers have reported decreased levels of omega-3 polyunsaturated fatty acids in patients with depression.(27–28)

The shortcoming of our study was that we did not gather data regarding the level of treatment each patient had received for either dry eye or depression or anxiety or rheumatoid arthritis. As such, it was not feasible to further distinguish where on the therapeutic spectrum each case occurred. possible confounding by the medications

used to treat depression. Antidepressant use has been identified as a risk factor for dry eye.(3,29,30) However, this association has been primarily linked to anticholinergic effects of such medications as tricyclic antidepressants

Psychiatric diseases such as depression and anxiety have been linked to a number of chronic medical conditions, including arthritis, cancer, lung disease, heart disease, and diabetes, among others.(31,32,33,34) It was suggested that such associations should have implications for treatment of both the psychiatric disease as well as the chronic medical illness in the primary care setting.(34) Going with the associations in our study, we are of opinion that dry eye disease should be among the same group of chronic medical illnesses with implications for psychiatric disease.

CONCLUSION

Statistically significant associations between dry eye disease and each of depression, anxiety and rheumatoid arthritis were identified.

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