

## The Relationship between Keratoconjunctivitis Sicca and Dry Eyes

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**Abstract:** We conducted a cross-sectional study involving 110 patients from Iraq to evaluate the impact of keratoconjunctivitis sicca on dry eyes. Several different hospitals were visited for data collection during the one-year period ranging from 1-9-2022 to 1-10-2023. In this study, the quality of life of patients with dry eyes was evaluated using the Visual Function Questionnaire 25, where The NEI VFQ-25 (25-Item National Eye Institute Visual Function Questionnaire). The research employed a cross-sectional design to collect data from 110 randomly selected hospitals having 60 male and 50 female respondents where Simple diagnostic criteria were prevalent: foreign body sensation for 20 patients, burning for 25 patients, itching for 15 patients, Blurred vision for 30 patients, red eyes for ten patients, Contact lens intolerance for ten patients. In this particular study, the logistic regression analysis showed that there are certain common elements that put one at risk for getting an infection: bulbar conjunctival redness (OR = 2.8, 95% CI = 2.1-3.9, P < 0.001), bulbar conjunctival oedema (OR = 3.1, 95% CI = 2.1-4.4, P < 0.001), itchy eye (OR = 3.3, 95% CI = 2.3-5.5, P < 0.001), and tearing (OR = 4.2, 95% CI = 3.4-6.2, P < 0.001). It can be concluded that the clinical and epidemiological characteristics of keratoconjunctivitis sicca are consistent with those previously described in the specialized literature with respect to age groups, sex, and the primary symptoms observed.

**Keywords:** Contact, Bulbar, Redness, Eye, Keratoconjunctivitis sicca, VFQ, Patients.

### INTRODUCTION

Dry eye syndrome happens due to insufficient or poor quality of tear, that causes lack of lubrication and moisture on the surface of the eye (Craig, J. P. *et al.*, 2017; Qian, L., & Wei, W., 2022; Hasan, Z. A., 2021). However, for some cases, it can be severe, leading to visual impairment and even ocular surface lesions. The symptoms that accompany this problem include an itchy feeling in the eye, the sensation of having sand in the eye, eye fatigue, blurring of vision, and light sensitivity (Paulsen, A. J. *et al.*, 2014).

"This condition, also known as keratoconjunctivitis sicca, affects about 5 million people in Spain and about 100 million people worldwide. Typically, it is repeated in both eyes and tends to affect more women, particularly after menopause. This malady arose from dysfunction in the upper and lower eyelids' meibomian glands. They are the oil glands secreting lipids used for eye moisture and lubrication (Chang, C. C. J. *et al.*, 2022).

Keratoconjunctivitis sicca presents with the typical symptoms of dry eye (burning and poor tearing), but has a specific cause in damage to the lacrimal glands typical of Sjogren's Syndrome. Sjogren's Syndrome is a chronic inflammatory disease of autoimmune origin (Andole, S., & Senthil, S.,

2023; Sobolewska, B., Schaller, M., & Zierhut, M., 2022).

Aging is one of the main factors that contribute to the development of ophthalmopathy, as it causes gradual atrophy of the tear glands, which is necessary for proper lubrication of the eye. Dry eye syndrome affects 25% of the total male population, while the majority of those affected by the developmental eye disorder are postmenopausal women (90% are affected by the relapsing disorder) over 45-50 years of age. This high percentage may be due to the hormonal imbalances that women suffer during and after menopause (Bilgic, A. A. *et al.*, 2023).

The ocular surface has this important coating, which is divided into three parts: the front lipid part, the middle watery portion, and the back mucus layer. It gets made through the meibomian glands, lacrimal glands, and goblet cells on the conjunctiva. Some paragraphs are just too difficult to understand, but there is amazing artificial intelligence that could rewrite them in a language you can comprehend as a human (Al Sabti, K. *et al.*, 2022; Napoli, P. E. *et al.*, 2019; Gupta, P. K. *et al.*, 2018; Viso, E. *et al.*, 2012; Uchino, M., & Schaumberg., 2013). The liquid covering the senses, nourishing and maintaining it, serving as a part of refraction, and clearing away dirt or dust

from the surface of the organ. Tear-deficient and evaporative types comprise tearless forms of dry eye which are meant as regards tear formation (Paugh, J. R. et al., 2008).

## MATERIAL AND METHOD

A cross-sectional study was conducted for 110 patients from Iraq, aiming to evaluate the results of the relationship between keratoconjunctivitis sicca and dry eyes.

Patients were collected from several different hospitals over a full-year study period ranging from 1-9-2022 to 1-10-2023.

The study was designed according to a cross-sectional design for a random sample of 110 different hospitals, with 60 males and 50 females distributed across the sample. Initial information related to height and age, gender, body mass index, symptoms, and educational and social level was collected. To conduct the research, some inclusion criteria (consent to participate in the research, absence of systemic diseases or other eye diseases that can coexist with the diagnosis of keratoconjunctivitis sicca) and exclusion criteria

(patient who had previous eye surgery, cognitive impairment) were taken into account.

Two interviews were conducted with the two patients in order to ascertain the changes that had occurred in their condition and to determine the strength of the statistical relationship between the two groups in this study.

The study population was comprised of individuals between the ages of 25 and 55, with no significant differences observed between genders.

In this study, the quality of life of patients with dry eyes was evaluated using the Visual Function Questionnaire 25 where. The NEI VFQ-25 (25-Item National Eye Institute Visual Function Questionnaire) is a measurement tool designed to assess vision-related quality of life in people with eye disease or vision loss. It was developed by the US National Eye Institute and is widely used in medical and clinical research.

Demographic data and information were also statistically analyzed according to the program IBM SOFT SPSS 22 and Microsoft Excel 2016

## RESULTS

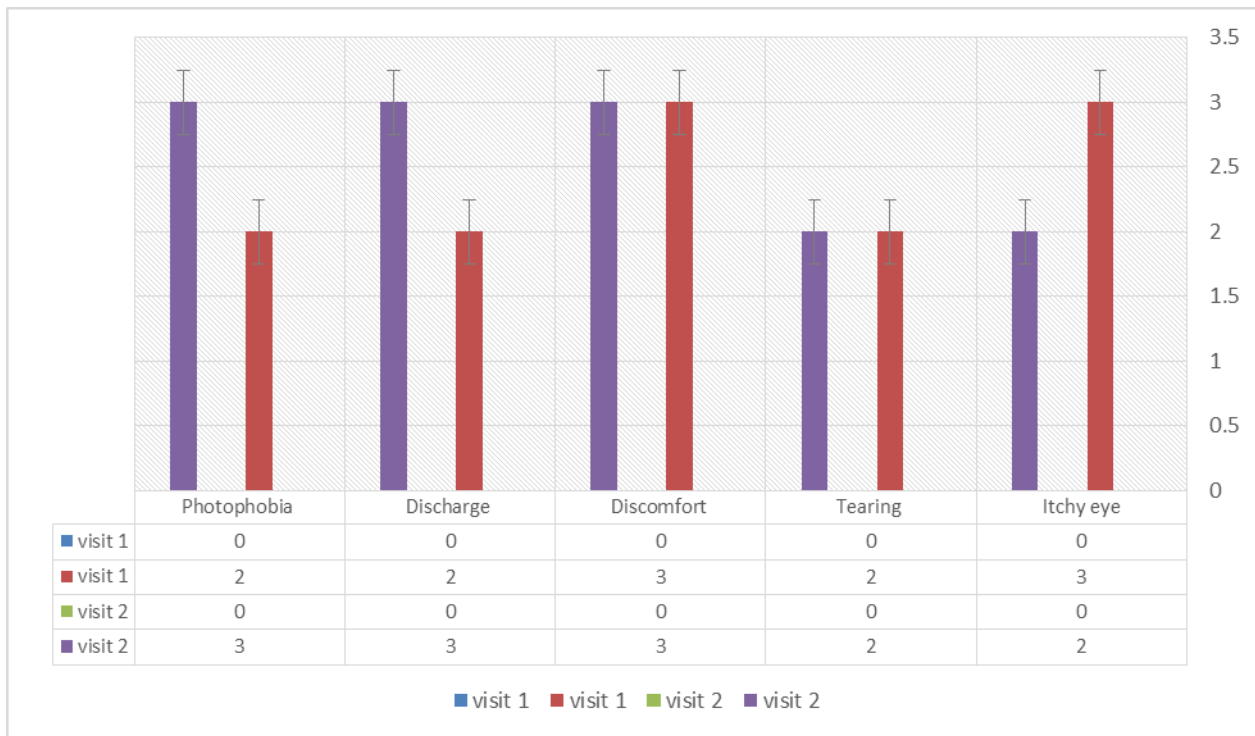
**Table 1-** General demographic characteristics of patients

Variable	
Age	
Mean	33.3
Sd	4.9
Range	25-55
Sex	
Male	60
Female	50
Symptoms, f	
foreign body sensation	20
burning	25
itching	15
blurred vision	30
red eyes	10
contact lens intolerance	10
with additional clinical signs	
mucooid ocular discharge	19
conjunctival hyperemia	21
blepharospasm	20
recurrent corneal ulceration	30
corneal vascularization	12
fibrosis and pigmentation	8
Education	
Primary	14
Secondary	36
College	50

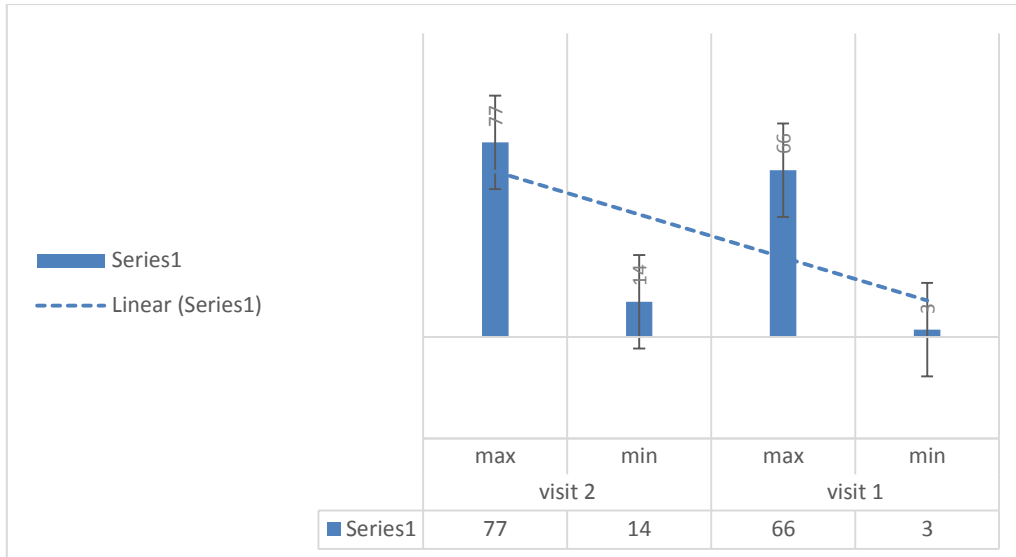
High	10
Outcomes	
300-700	39
800-1200	51
>1200	10

**Table 2-** Concentrations of Proteins and Elements Determined in the Tear Film of AMD Patients

v	AMD
Protein concentrations	
Lactoferrin (m ± SD, mg/mL)	9.21 ± 2.33
S100A6 (m ± SD, ng/mL)	555.53 ± 322
CFH (m ± SD, ng/mL)	2066 ± 1490.9
Clusterin (m ± SD, mg/mL μg/mL)	27.5 ± 15.5
APP (m ± SD, ng/mL)	177 ± 60.9



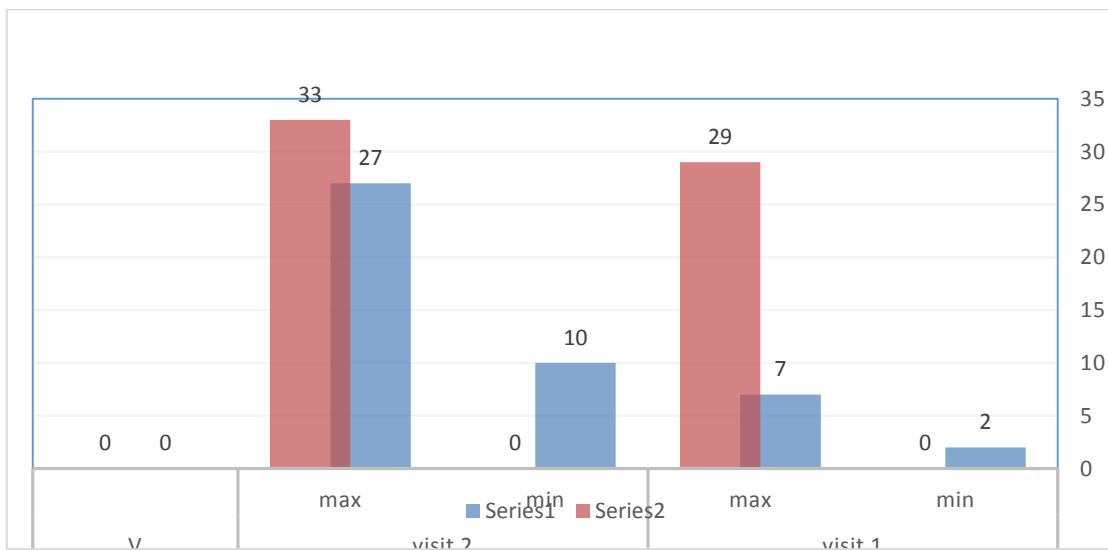
**Fig 1-** Median and [range values] of the clinically assessed signs and symptoms before (Visit 1) and after (Visit 2) treatment.



**Fig 2-** Mean and slandered division of Iraqi patients according to ocular surface disease index

**Table 3-** Outcomes of patients according to Subjective/invasive assessment

p	V1	V2
Bulbar conjunctiva redness	33±4.5	10.2±2.2
Bulbar conjunctiva oedema	11.8±6.8	3.9±1.1
MG secretion	[0.0–2.0]	[0.0–2.0]



**Fig 4-** Health results related with noninvasive break-up time and tear film surface quality\_K5M

**Table 4-** Assessment outcomes of patient’s quality of life with dry eyes according to Visual Function Questionnaire 25

v	V1	V2	P-value
Physical Functioning	39.6±5.2	44.7±5.3	0.99
Role Physical	42±6.2	61±6.1	0.01
Bodily Pain	37±9.9	48.3±4.4	0.05
Vitality Index	38.9±3.2	51±7.2	0.08
General Health Perceptions	41±4.9	66.2±3.2	<0.01
Mental Health Index	38.6±5.9	44.1±7.2	0.6
Physical Component Scale	36.6±5.2	55.6±4.8	<0.01
Mental Component Scale	39.8±6.9	42±4.4	0.74

**Table 5-** Logistic regression to evaluate risk factors in this study

	CS9 (OR)	P-value
Age	1.4 (0.5-2.1)	0.92
Sex	1.2 (0.8-1.6)	0.88
Bulbar conjunctiva redness	2.8 (2.1-3.9)	<0.001
Bulbar conjunctiva oedema	3.1 (2.1-4.4)	<0.001
Itchy eye	3.3 (2.3-5.5)	<0.001
Tearing	4.2 (3.4-6.2)	<0.001
Bodily Pain	2.6 (1.8-4.4)	<0.001
Physical Component Scale	1.5 (0.88-1.9)	0.62

## DISCUSSION

Dry eye is a disease that is medically referred to as "sicca syndrome" or "keratoconjunctivitis sicca." It is characterized by a severe lack of moisture in the eye (Schmidl, D. *et al.*, 2015).

The current study indicates that one of the causes of dry eyes is the process of aging, which is one of the most prominent reasons for a decrease in the production of tear fluid, which is responsible for moisturizing the eyes. Furthermore, there are specific periods during the day when tear production is reduced (Abusharha, A. A., & Pearce, E. I., 2013).

For instance, tear production in the eyes is reduced in the evening, which may result in dehydration. It has been demonstrated that women are more susceptible than men to developing dry eyes. This is attributed to the fact that hormonal changes that occur during and after menopause affect the composition of tear fluid. Furthermore, environmental factors also contribute to the development of dry eyes (Abusharha, A. A., & Pearce, E. I., 1999).

A total of 110 patients were recruited from various hospitals in Iraq, with 60 males and 50 females. The most common symptoms observed in this study were burning in 25 patients, blurred vision in 30 patients, and foreign body sensation in 20 patients (Table 1). Additionally, several other clinical signs were identified, with recurrent corneal ulceration being the most prevalent in this study, affecting 30 patients and blepharospasm affecting 20 patients.

The principal challenge in diagnosing this syndrome is that its symptoms present in a very generalized manner, which can be attributed to other common conditions such as allergies or simply the individual's ageing process. Consequently, the diagnosis of the disease may be extended until a comprehensive study of the

symptoms, tear formation, and functioning of the meibomian glands has been completed.

The analysis of relevant literature indicates that 7.8% of women and 4.7% of men over the age of 50 in the Arab world suffer from dry eyes. This is believed to affect 4.8 million people globally. In other countries, such as Europe, dry eye syndrome is the most common cause of eye irritation in people over the age of 65, with a prevalence of 75% in people over the age of 50. In this context, the advancement of ophthalmology on a global scale has facilitated the emergence of novel avenues for diagnosis and treatment. However, in the case of dry eye syndrome, the persistent challenge faced by specialists in this field is the accurate diagnosis, which necessitates the conduct of a clinical study to obtain the essential elements that enable the delivery of optimal care, thus preventing the occurrence of irreversible consequences that threaten visual health (Rico-del-Viejo, L. *et al.*, 2019; Machalińska, A. *et al.*, 2016).

As people age, they tend to produce fewer tears, which can lead to dry eyes. However, this condition is more prevalent in women, particularly postmenopausal women. This study's findings align with the existing literature on sex and age differences in dry eyes. It suggests that in such cases, the meibomian glands' functionality changes, resulting in a tear film that breaks within a few seconds of opening the eye. This, in turn, leads to the exposure of nerve endings and corneal cells. The conjunctiva is exposed to air and eyelid friction, which causes inflammation of the entire area (Feng, Y. *et al.*, 2014; Dogan, A. S. *et al.*, 2018).

As previously stated, dry eye is a highly prevalent condition, affecting between 20-25% of the general population. The risk of developing dry eye increases significantly after the age of 50, with the condition affecting practically the entire population over the age of 70. Consequently, it is

one of the most prevalent ocular conditions, although it is rarely a significant concern.

The results of the logistic regression analysis in this study indicated that the following factors were significantly associated with an increased risk of infection: bulbar conjunctival redness (OR = 2.8, 95% CI = 2.1-3.9,  $P < 0.001$ ), bulbar conjunctival oedema (OR = 3.1, 95% CI = 2.1-4.4,  $P < 0.001$ ), itchy eye (OR = 3.3, 95% CI = 2.3-5.5,  $P < 0.001$ ), and tearing (OR = 4.2, 95% CI = 3.4-6.2,  $P < 0.001$ ).

## CONCLUSION

We conclude that, clinically and epidemiologically, keratoconjunctivitis sicca was similar to what has been described in the specialized literature in terms of age groups, sex, and the main symptoms described.

It is certain that dry eye syndrome involves various disorders with distinct causes. Therefore, clinicians must realize the range of dry eye symptoms, necessitating a comprehensive history and investigation to determine the cause of dry eye.

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