

# Effects of overuse of phones and other smart devices on Blepharitis and dry eye

**1. Dr. Hassan Muslem Abdulhussein**

M.B.Ch.B. \ F.I.C.M.S. \ (O & E)

Ministry of Higher Education & Scientific Research, Dijlah University College, Radiology Techniques  
Department, Baghdad, Iraq.

[hasan.muslim@duc.edu.iq](mailto:hasan.muslim@duc.edu.iq)

[hassanb64r6yzv@gmail.com](mailto:hassanb64r6yzv@gmail.com)

**2. Dr. Khalid Ghaffar Kadhim**

M.B.Ch.B. \ F.I.B.M.S. \ (Community Medicine)

Ministry of Health, Baghdad Medical Office Al-Russafa, Al-Kindeg Teaching Hospital, Baghdad, Iraq.

[Khalidalmaarof@yahoo.com](mailto:Khalidalmaarof@yahoo.com)

**3. Dr. Ali Tariq Hussein**

M.B.Ch.B. \ A.B.E.M. \ (Emergency Medicine)

Consultant Emergency Medicine

NMC Royal Hospital, Khalifa City, Abu Dhabi, UAE.

[a.tariq36@gmail.com](mailto:a.tariq36@gmail.com)

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**Abstract :** One hundred (100) patients were collected from different hospitals in Iraq, and a cross-sectional study was designed using an electronic system) what is the name of the system) of samples that were evaluated and approved by the competent committees in Iraq?

The population included in the study was residents of Baghdad, Muthanna, and Basrah Governorates who voluntarily agreed to participate from 5 years to 45 years of age and indicated that those under 18 years of age should obtain permission from their parents or legal guardians (expressing consent in an e-mail form prior to arrival to the exploratory study).

The data collected by in this research, the questionnaire, which was designed based on a number of sections, including the age of patients, in addition to the variables associated with smart phone devices and visual symptoms to the eyes. Demographic data related to the patients were also analyzed by relying on the IBM SOFT SPSS program.

The patients were classified into two groups (60 patients and 40 control). The period of time the patient spent on the phone was  $4.3 \pm 1.9$  for the patient and  $3.5 \pm 1.1$  for the control

in this study, the assessment according to dry eye severity (for mild, 10 (16.6), control 26 (65)-Moderate for patient 33 (55), control 8 (20)-Severe Irreversible damage to the ocular surface Plus for patient 17 (28.3), control 6 (15) with p-value  $< 0.05$

Complications found in this study include Conjunctivitis, Keratitis, Corneal ulcer, Inability to wear contact lenses, Damage to the surface of eyes, decreased quality of life, and Photophobia for 40 patients and 17 control.

Statistical analysis program was used to find out the type of statistical relationship emerging between the time spent using smartphones and dry eyes, where person correlation was used at a statistical significance level at p-value  $< 0.001$ , while in this study, it was found that there is a direct relationship between the Time spent to use a phone with dry eyes.

**Key words:** Eye, Schirmer, Blepharitis, Phone, Disease, Dry.

## Introduction

The study aims to find out the abusive effects of screens and electronic devices in dry eye, as dry eye disease is one of the common diseases that affect a large number of people of all ages.

Dry eye disease is a pathological condition that may result from a deficiency in the secretion of eye tears (Lacrimation) or increased evaporation of tears, which consequently leads to a defect in the function of the tear film [1,2].

Dry eye is associated with many signs and symptoms, including redness and burning sensation. The level of sight fluctuates, and the feeling of dry eyes [3,4]. With the change taking place as a result of the Corona pandemic and the doubling of the need to use electronic technologies and devices in education and remote work activities, (digital eye strain syndrome) has emerged [5,6], which occurs with the increase in the use of electronic devices for long periods and severe eye fatigue.

Dry eye affects the ability to carry out daily tasks, such as using a computer or reading for long hours, in addition to making it difficult to bear staying in dry weather, in addition to feeling dry eyes is annoying, which in itself is harmful to it and may exacerbate other serious problems. [7,8,9]

It may affect the health and safety of vision, the specialist himself explains in a statement to the Hesperis electronic journal. [10,11]

According to previous studies, which warned that looking at a mobile phone screen for two hours or more per day may lead to dry eyes and headaches. [12] The study, which was presented at the American Association for the Advancement of Science conference in Seattle, USA (date of the conference), found that the problem of eye strain experienced by employees worsened if they spent more than two hours using smartphones. [13] Based on a study conducted an experiment involving (65) people between the ages of 18 and 30 years and found that 54 percent suffered from problems related to the length of looking at screens, including dry eyes or headaches. [14]

Currently, there is no scientific evidence that mobile phone and tablet screens impair vision. The research was done using lab light, and it appears there may be some cell death. However, [15,16] no study indicates that these electronic devices cause eye damage in humans.

The amount of time spent on the phone or computers affects the eye, as it may cause dry eyes, and according to the University of Iowa Hospitals, eyelashes decrease by 66% during the day while using computers, and the same applies to the mobile phone, as the eye When blinking, wet substances such as tears spread in the eyes while remaining open makes them more exposed to air, and thus causes redness and dryness, and eye dryness increases with the increase in screen brightness. [17,18,19]

Noticing eye itching and difficulty opening them in the morning is the most common manifestation of dry eye, a disorder that occurs when there are not enough tears, or they are of poor quality and which, if left untreated, can cause eye abrasions. [20]

## Methodology

The population of the study is Hundred (100) patients were collected from different Iraqi hospitals in Iraq, and a cross-sectional study was designed using an electronic system of samples that were evaluated and approved by the competent committees.

In designing this study, aspects of bioethics, data privacy, adherence to the Declaration of Helsinki, and compliance with the national personal data protection law, were considered.

The population included in the study was residents of Baghdad, Muthanna, and Basrah Governorates, who voluntarily agreed to participate; their ages were from 5 years to 45 years of age, and it indicated that those under 18 years of age should obtain permission from their parents or legal guardians (expressing consent in an e-mail form prior to arrival to the exploratory study).

The variables of the Questions were about age, gender, pre-existing eye conditions, use of screens, increased visual exposure time to screens, and about the presence of visual symptoms and difficulties in stabilizing vision in reading or smart devices.

Regarding eye conditions, we specifically asked about dry eye prognosis, daily use of medicated eye drops, or none of the above.

In the question about the usual use of electronic devices with screens such as television, cell phone, tablet, computer, laptops, etc. - one had to answer yes or no.

Another question focused on increasing hours of use of electronic devices (with screens), and if so, how many total hours were used (up to 2, 4, 6, 8 hours, or more).

With regard to the use of the monitors, information was collected about red eye irritation, the sensation of dry eyes, burning, itching, tearing, and increased blinking or no ocular symptoms.

The question that indicates whether a person suffers from a reading disability or an eye problem that prevents him from watching television or working with the screens of electronic devices had to be answered negatively or positively.

It was also divided according to the age range of the studied population into seven groups: from 5 to 14 years old, from 15 to 24 years old, from 25 to 34 years old, and from 35 to 45 years old. The results were processed in an electronic database (Google Sheets®), and a descriptive analysis was carried out. Statistical analysis according to IBM SOFT SPSS 25:0

A distributed questionnaire was designed on the patients diagnosed in this study, and a database was created using Microsoft Access; statistical analysis was performed using IBM SOFT SPSS 25:0 for Windows, and the final document was prepared with the Microsoft Office package.

In this study, the deviations were calculated to determine the factors associated with Eye inflammation associated with the use of smart devices. Logistic regression was used as a statistical method; Prevalence ratios and 95% confidence intervals were calculated according to using the SPHERMAN TEST and associated p-value.

The figures were designed using Microsoft Excel 2013; in addition to, the predictive analyzes were carried out by relying on logistic analysis to know the factors that posed more danger to dry eyes and by considering the level of statistical significance P value <0.05.

## Results

Table 1- Shows the Baseline characteristics of the sample study

Variable	Patient, N=60	Control, N=40
AGE		
5-14	35	20
15-24	10	7
25-34	10	8
35-45	5	5
Male	35	20
Female	25	20
Educational background of participants		
Primary education	20	18
Secondary	20	6
College	14	10
High education	6	6
Symptoms of Blepharitis		
Soreness of the eyelids	8	8
itching	10	6
a gritty feeling in the eyes	7	10
flakes or crusts around the roots of the eyelashes	12	8

eye redness	13	4
Headache	10	4
OSDI, units	30.9±10.2	8.2±3.3
Schirmer I, mm	16.3±5.5	5.3±2.9

Figure 1- The period of time the patient spends on the phone

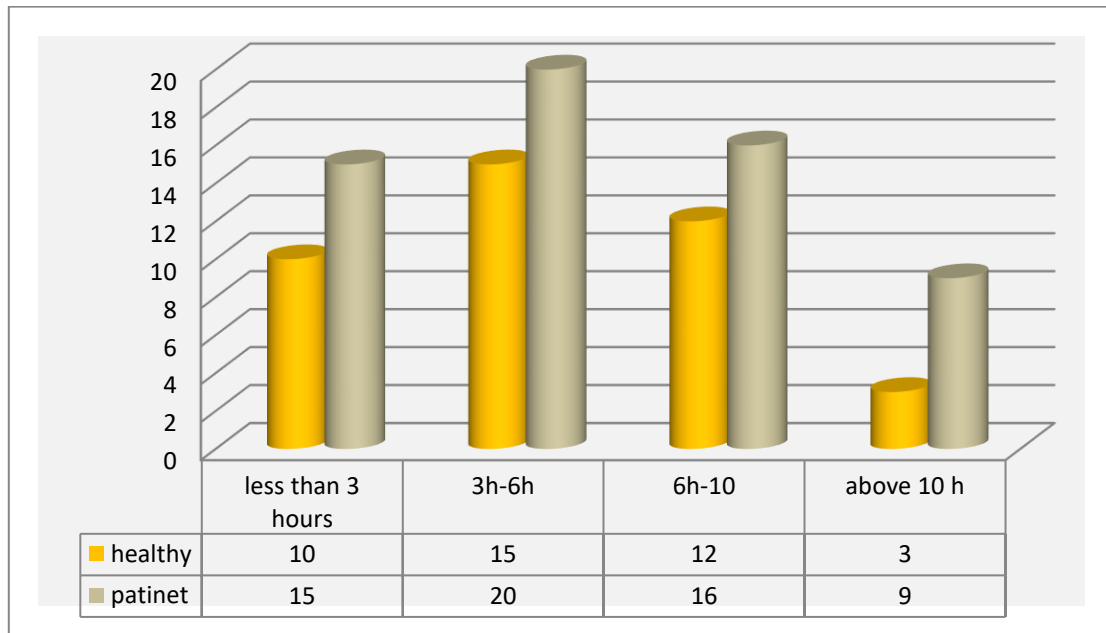


Table 3- Shows the Characteristics of the monitors

Monitor size	F	P%
15	50	55.5
17	40	44.4
Distance to Monitor from The eye		
<25cm	66	73.3
>25cm	24	26.6

Fig 2- Patient outcomes related to Type of dry eye

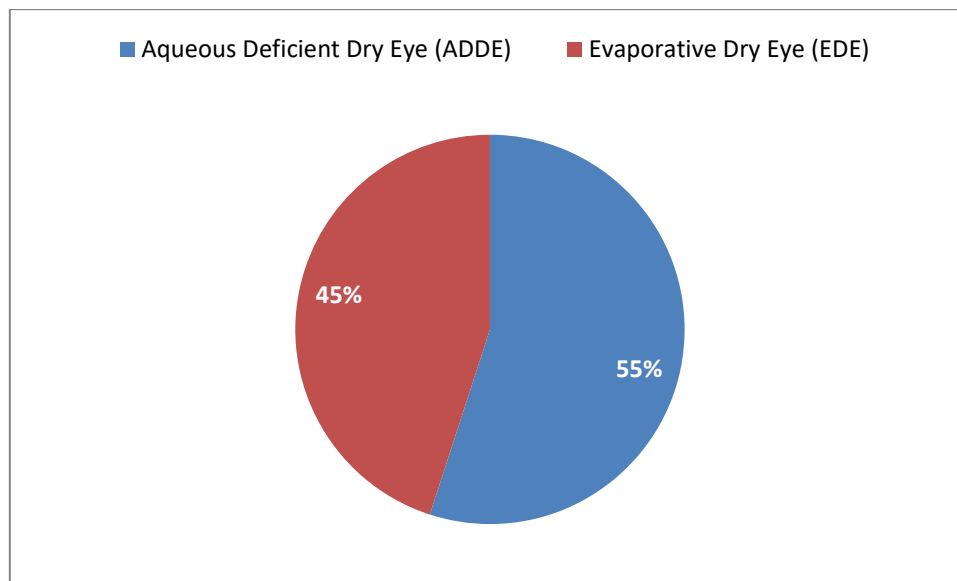


Table 5- Outcome assessment of dry eye severity

Variable	Patient	N (%)	P-value
Mild Spontaneous restoration of the ocular surface Plus	10 (16.6)	26 (65)	0.88
Moderate Restoration of the ocular surface is possible with appropriate treatment Plus	33 (55)	8 (20)	0.005
Severe Irreversible damage to the ocular surface Plus	17 (28.3)	6 (15)	0.001

Table 6- Outcomes of the sample according to the number of blinks and Number of partial blinks, n/20 s

Variable	Healthy control	Patient	P-value
Number of blinks	5.33±2.1	18.9±8.8	0.0099
Number of partial blinks, n/20s	3.11±2.7	8.9±3.9	0.00322

Table 7- Assessment Dimensions of the IDEEL of patient

Dimensions of the IDEEL	Patient	Healthy control
Dry eye Symptom Bother	44 (73.3)	10 (25)
Impact on Daily Activities	35 (58.3)	7 (17.5)
Emotional Impact Due to Dry Eye	27 (45)	5 (12.6)
Impact on Work Scale	36 (60)	21 (52.5)

Table 8-Evaluation of general complications to the patients of this study

Dimensions of the IDEEL	Patient	Healthy control
Conjunctivitis	8	3
Keratitis	6	3
Corneal ulcer	7	2
Inability to wear contact lenses	6	2
Damage to the surface of the eyes.	6	2
Decreased quality of life.	5	4
Photophobia	3	1
Total	41	17

Table 9- Logistic regression to risk analysis of dry eyes

Factor	Cs-95% with risk factor	P-value
Gender	0.56 (0.34-0.66)	0.34
Age	1.9 (1.3-2.8)	0.005

Hours of phone use	1.4 (1.1-1.65)	<0.001
Not Taking breaks	0.87 (0.66-0.97)	0.05
Monitor size	1.32 (1.11-1.56)	<0.001
Distance to Monitor from The eye	1.88 (1.56-2.1)	<0.001

## Discussion

Dry eye as a multifactorial disease of the ocular surface characterized by a loss of balance in the tear film and accompanied by visual symptoms, where tear instability, hyperpolarization, inflammation, and tear damage play an etiological role. Ocular surface and neurosensory changes.

The prevalence of this disease in Iraq is 11%, with a confidence interval of 8.8–13.3%, and it affects women in 11.9% and men in 9%.

The origin of this disease is multifactorial and affects the entire ocular surface: eyelids, tears, conjunctiva, cornea, lacrimal glands, meibomian glands, eyelid dynamics, and homeostasis regulation mechanisms. It is necessary to highlight the afferent and efferent innervation that has the first-order role because it affects an organ such as the cornea that has the greatest sensory innervation of the whole body, with the afferent innervation, to adapt the tear to every situation [21,22]. Excessive tear disease damages the epithelium of the conjunctiva and cornea and begins the cascade of Inflammatory disease that perpetuates damage to the ocular surface. These two factors are important to consider as therapeutic targets for reversing the vicious cycle of symptoms and inflammation into another effective circuit that restores balance. [23]

The traditional classification divides the disease into two subcategories, dry eyes due to a lack of the aqueous layer of the tears and dry eyes due to a change in evapotranspiration. [24]

Electronic devices are clearly a part of our lives: computers at work and home, mobile at leisure, and tablets for consulting websites playing games, or watching videos. This daily use of new technologies increases the number of cases of dry eye syndrome in ophthalmology consultations, and the use of screens for these devices appears to further accelerate this pathology. [25]

Being in front of the screen for a long time is the main factor in causing a significant decrease in the number of flashes, 3 to 4 times per minute, which is a very low number compared to the normal blink per minute, which is 20. Inducing various visual changes that put visual health at risk, such as visual fatigue and dry eyes, among other conditions.

Tears are an essential component of the eye's structure and are made primarily of water, but they also contain proteins, lipids, and other chemical components.

One of the main consequences of excessive use of mobile devices is visual fatigue. Exposure to several hours in front of a screen without blinking tends to make our eyes difficult to focus on seeing at different distances due to tension in the eye muscles. [26,27]

Dry eye is more common in women, and the risk of its occurrence increases at younger ages in this study and; thus, age and gender are important risk factors.

In terms of causes, 75% of dry eye cases result from a condition known as meibomian gland dysfunction. [28,29]

These glands located in the eyelids become clogged, and fat accumulates inside, preventing them from secreting the fats necessary for the correct formation of the tear film. This causes the tears to evaporate rapidly, causing a vicious cycle of dehydration and a decrease in the quality of tear production, and thus dry eyes from this cause is of the evaporative type and is the most common.

Visual fatigue leads to a series of symptoms, including tears, red eyes, blurred vision, and headaches.

A 2018 study by NIOSH (National Institute for Occupational Safety and Health) reported that prolonged use of electronic devices is directly linked to dry eyes and an increased risk of myopia and visual fatigue.



Another change that results from increased organs is dry eye, a disease that changes the layer of the tear film to the eye and develops vision problems, such as redness, blurred vision, inflammation, and a sensation of dryness. Dry eye is a disease that affects 70% of the world's population. Young people are the most affected population, and more than 60% of young people suffer from dry eye syndrome and one of the possible causes is the prolonged use of mobile devices.

Studies suggest that the majority of the affected population is women due to evidence supporting a role for sex hormones such as oestrogen in the etiology of dry eyes.

Dry eye irritation symptoms can be debilitating and cause psychological and physical effects that affect a person's quality of life.

In addition, experts note the importance of using the devices in luminous places more than 40 cm from the eye and with good ventilation.

Should set 20-minute breaks after one hour of use, and you should blink constantly. This habit encourages the production of tears in a natural way which is very important because it is necessary to lubricate the eye and eliminate foreign particles.

### Conclusion

One hundred patients were included for the effects of overuse of phones and other smart devices on Blepharitis and dry eye.

In this study, it was found that there is a direct relationship between Times spent to use a phone with dry eyes. Logistic analysis was also used to find out the factors that were more dangerous to dry eye. It was found that Hours of phone use and Distance to Monitor from the eye.

Several recent studies show that much of the population experiences any of these discomforts, whether they are moderate or severe. Among the most common include dry eyes, sensitivity to light, headache, glare, blurred vision, digital eye syndrome, tearing, dryness, and difficulty concentrating.

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