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Effects of Overuse of Phones and Other Smart Devices on Blepharitis and Dry Eye

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Abstract: Dry eye is a multifactorial disease; that is, there may be many causative factors. In this study, it was identified the Effects of overuse of phones and other smart devices on Blepharitis and dry eye. In this research, a cross-sectional demographic study was conducted to the Iraqi population to find out the effect of smartphone devices on dry eyes; where 90 patients were collected from several different hospitals, and demographic information and data related to patients were collected through the distribution of a questionnaire containing a set of questions between the year 2019 -2020 and the patients' ages ranged from 20 to 30 years. The assessment of the severity of dry eyes was based on the Schirmer I test from the insertion of the end of a tape 5 mm wide and 30 mm long. The cut-off points of the Schirmer I test is between 5 and 15 mm and using 5 mm as the cut-off standard, sensitivity, and specificity of 100% for this test have been described. The results which found in this study (90 patients collected with age between 20-30 years distributed to 60 patients' male and 30 patients' females, The amount of time the patient spent on the phone were 3 hours to 6 hours for ten patients with 11.11% and from 6 hours to 10 Hours for 20 patients with 22.22% and 21 patients with 23.3% for more than 10 hours). 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. In this study, it was found that there is a direct relationship between the Time spent using 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.

Keywords: Eye, Schirmer, Blepharitis, phone, disease, Dry.

INTRODUCTION

The eye is a gift for living organisms that enables them to see, as it works to convert visual images into light energy and then convert it into electrical impulses. Then it is sent to the nerve cells [Hayes, J.R. *et al*., 2007; Logaraj, M. *et al*., 2014]. Therefore, any danger that may affect this divine gift, such as the damage of the phone to the eye, must be dealt with carefully and prevented [Reddy, S.C. *et al*., 2013].

The retina and lens, as well as the cornea, absorb the radiation from the cell phone. These rays cause severe damage to the retina, such as macular degeneration or retinal degeneration [Sen, A. *et al*., 2007].

The use of technological devices has increased dramatically due to social isolation, and this increase has led to a significant increase in eye diseases in the population, in addition to dry eyes [Sen, A. *et al*., 2007]. Therefore, it is important to highlight the different ocular surface changes that exist in the Iraqi population due to the excessive use of tics [Shantakumari, N. *et al*., 2014; Agarwal, S. *et al*., 2012].

Eyelashes help moisturize the eyes. On average, we code between 16 and 20 times per minute. However, when we are in front of the phone, that number drops to more than half. In front of the mobile, weblink only 6 or 8 times. This is due to the increased brightness of the screen [Motoko, K.K, 2016; Romero, J.M. *et al*., 2004].

Today the use of technologies has increased significantly, precisely because it has become an essential tool in the daily life of human beings, and mobile phones, tablets [Bitton, E. *et al*., 2019], computers, and smart devices have become a necessity for carrying out various work, academic or social tasks [Amano, S. *et al*., 2017]. There is also no doubt that the use of technology has meant a great help in different situations of life[Asiedu, K. *et al*., 2018], facilitating communication between people and making many processes more efficient (González, 2021). In general, the concept of ICT covers a different set of electronic devices that allow communication and information to be carried out more easily [Rhee, D. *et al*., 1999; Ao, A, 2018]. (Pinargote & Cevallos, 2020) Incorporating the use of ICT into daily life comes with a variety of benefits, but it can also cause various health problems, including eye problems, especially due to visual fatigue and excessive stress (Skoblina, *et al*., 2020). The daily use of

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technologies has also greatly damaged the health of people's eyes due to the blue light and ultraviolet rays emitted by them [Ng, A. *et al*., 2012; Goto, T. *et al*., 2010]. Day after day, the retina absorbs light particles emitted by electronic devices, which is also considered a degraded biological material [Ng, A. *et al*., 2015]. The main problem is that this technological substance can cause changes in the level of blood flow, which causes premature aging, as well as eye diseases [Hunter, M. *et al*., 2015]

Dry eyes occur depending on the time a person spends in front of mobile devices, and if the time is long, this problem leads to dry eyes; according to related studies that state that if a person uses mobile devices for long periods of time, this reduces eyelashes by up to 66 % When the eye diffuses the moist matter by blinking, and when the eye remains open for long periods of time, the air is easily exposed to the eye, and this leads to dry eyes and gets worse as the mobile phone screen gets brighter[Platia, E.V. *et al*., 1978; Donaldson, D. D, 1969].

MATERIAL AND METHOD

In this research, a cross-sectional demographic study was conducted to the Iraqi population to find out the effect of smartphone devices on dry eyes; where 90 patients were collected from several different hospitals, and demographic information and data related to patients were collected through the distribution of a questionnaire containing a set of questions between the year 2019 -2020 The patients' primary information was included, which included name, age, gender, in addition to the date of the visit and clinical symptoms, and the patient's ages ranged from 20 to 30 years. Patients under the age of 18 and over 30 years were excluded, in addition to patients who They suffer from fatal comorbidities

This research was developed based on two study variables; Eye diseases and the use of smartphones. The methodology was based on a bibliographic review that followed the step-by-step procedure of search, selection, review, and interpretation.

In this research, the questionnaire was designed based on a number of sections, including the ages of patients, in addition to the variables associated with smartphone devices and visual symptoms to the eyes. Demographic data related to the patients were also analysed by relying on the IBM SOFT SPSS program.

Where 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

Patients were divided into three different age groups, and the most frequent ages in this study were from 20-23 years, 38 patients with 42.22%, from 24-27 years old, 29 patients with 32.22%, from 28 -30 years for 23 patients with 25.5% as shown in Table 1.

Table 1: Distribution of patients according to age

Age	F	P%	CHI-SQUARE
20-23	38	42.22	
24-27	29	32.22	8.98
28-30	23	25.5	

Patients were distributed according to a part in this research. An increase was found in the number of male patients for 60 patients with 66.6 and the number of female patients for 30 patients with 33.33, as shown in Table 2.

Table 2: Distribution of patients according to sex

sex	f	P%
Male	60	66.6
Female	30	33.3

In Figure 1, the time it takes for patients to use smartphones was calculated, and it was noted that there was a great demand for using phones, and this had a significant impact on dry eyes, as it was observed that patients used between 3 hours to 6 hours for ten patients with 11.11% and from 6 hours to 10 Hours for 20 patients with 22.22%

was also found to be addictive in the use of smartphones to ages ranging between 20-23 years

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for 21 patients, with 23.3% for more than 10 hours, as shown in Figure 1.

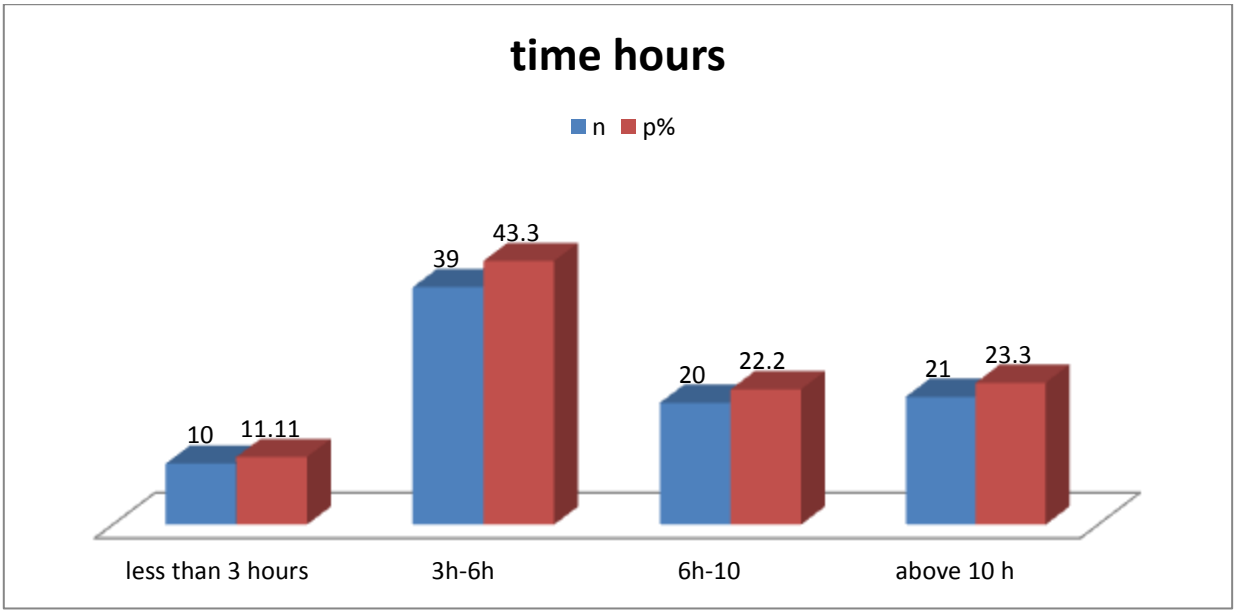

Figure 1: The amount of time the patient spends on the phone

Table 3: Eye-related results from smartphone use

Variable	Male, N=60	Female m N=30	P-value
Headache	40	25	0.87
Dry eyes	60	30	0.95
eye warming	40	19	0.01
Eyelid message	29	13	0.88
Double vision	18	7	0.06
Blurred distant vision	19	6	0.01
chalazion	20	8	0.01
scaly eyelashes	23	5	0.05

Table 4: Characteristics of the monitors

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

The Schirmer test is done by placing a thin strip of filter paper on the inside of the lower eyelid. Hydration is measured to measure how much tears are produced.

The Schirmer test determines whether the eye is producing enough tears to keep the eye moist. This test is performed when the patient suffers from severe dehydration and excessive watering due to symptoms of dehydration. The test is easy to perform, and there is no risk to the patient when it is performed.

Before the test, drops containing a local anesthetic must be used in order to avoid watering of the eyes due to possible irritation caused by the filter paper. Then the doctor places these special strips of paper inside the lower eyelid, between the lining and the conjunctiva in each eye. The eyes are usually closed for five minutes, gently. After this time, the doctor removes the strips and measures the resulting hydration. If the measurement is less than 10 millimetres after five minutes, we can confirm the diagnosis of dry eyes due to decreased tear production.

When the test gives more than 10 mm of moisture on the filter paper, the result is negative, and the patient does not suffer from this disease.

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A measure of dry eye was used, and we note that there are higher indicators of dry eye in women than in men, as shown in the figure below.

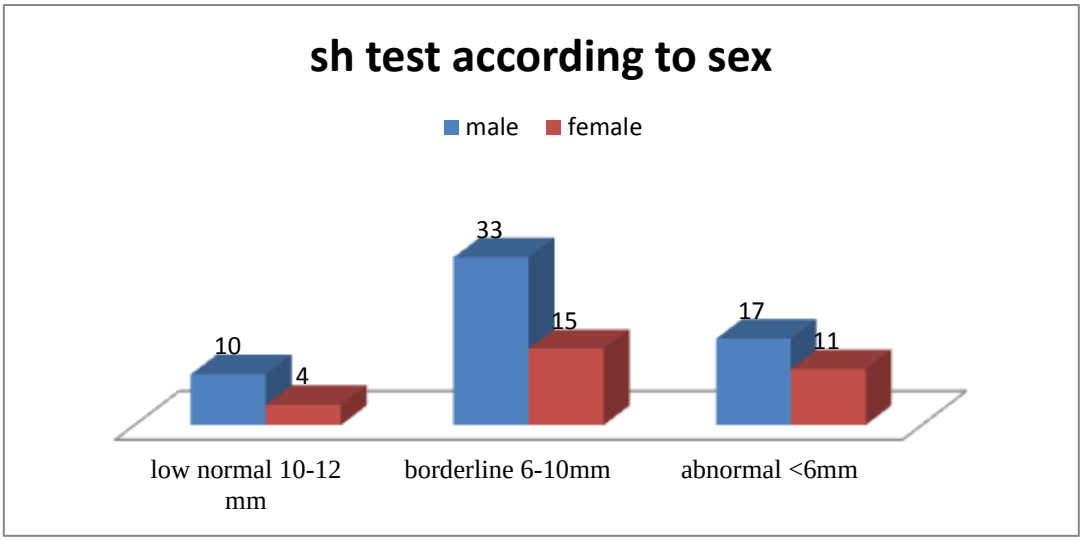

Figure 2: Results of Schirmer's test in the study

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

Table 5: Person correlation between Time spent to Used phone and Dry eyes

Correlations			
		Time spent to Use the phone	**Dry eyes**
Time spent to Use the phone	Pearson Correlation	1	0.204
	Sig. (2-tailed)		0.005
	N	90	90
Dry eyes	Pearson Correlation	0.204	1
	Sig. (2-tailed)	0.005	
	N	90	90

Table 6: 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
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

Patients were divided into three different age groups, and the most frequent ages in this study were from 20-23 years, 38 patients with 42.22%, from 24-27 years old, 29 patients with 32.22%, from 28-30 years for 23 patients with 25.5% as shown in Table 1

Electronic devices are clearly a part of our lives: computer 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.

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.

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Tears are an essential component of the eye's structure and are made primarily of water but 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.

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. This disease 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 the role for sex hormones such as estrogen in the ethology 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

Ninety 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 the Time spent using 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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