

Effect of Cellular Phone and Video Games on Dry Eye Syndrome among University Students in Buraimi

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ABSTRACT

Aim

To investigate the effect of mobile phone use among University students in Buraimi.

Methods

The cross-sectional survey was conducted to assess the effect of Cellular Phone and video Games on Dry Eye Syndrome among University Students in Buraimi. The sample size was estimated in the study (100). The participants were randomly selected and the study was conducted in a standard optometry set up. Prior to the examination, informed consent was taken from the selected participants. The study was approved by research and ethical committee of the college of health science, University of Buraimi.

Findings (Results)

The study aimed to investigate the effect of mobile phone use among University students in Buraimi. A total of 100 sample size between 18-25 age were taken for the purpose of analysis. The finding is that using a cellular phone and video game has a negative influence on dry eye syndrome which 42% of sample size Smartphone use was more common in the dry eye disease.

Conclusions

This study shows that using cellular phone and video game has a negative influence on dry eye syndrome.

KEYWORDS: Cellular phone; University; Students; Dry eye syndrome

1. INTRODUCTION

1.1. Background

Dry eye is a condition in which a person doesn't have enough quality tears to lubricate and nourish the eye. Tears are necessary for maintaining the health of the front surface of the eye and for providing clear vision. Dry eye is a common and often chronic problem, particularly in older adults. With each blink of the eyelids, tears spread across the front surface of the eye, known as the cornea. Tears provide lubrication, reduce the risk of eye infection, wash away foreign matter in the eye, and keep the surface of the eyes smooth and clear. Excess tears in the eyes flow into small drainage ducts in the inner corners of the eyelids, which drain into the back of the nose. Dry eyes can occur when tear production and drainage is not in balance. People with dry eyes either do not produce enough tears or their tears are of a poor quality because of many reasons such as inadequate amount of tears. Tears are produced by several glands in and around the eyelids. Tear production tends to diminish with age, with various medical conditions or as a side effect of certain medicines. Environmental conditions, such as the wind and dry climates, can also decrease tear volume due to increased tear evaporation. When the normal amount of tear production decreases or tears evaporate too quickly from the eyes, symptoms of dry eye can develop. Also by the Poor quality of tears. Tears are made up of three layers: oil, water, and mucus. Each component protects and nourishes the front surface of the eye. A smooth oil layer helps prevent

evaporation of the water layer, while the mucin layer spreads the tears evenly over the surface of the eye. If the tears evaporate too quickly or do not spread evenly over the cornea due to deficiencies with any of the three tear layers, dry eye symptoms can develop. The most common form of dry eyes occurs when the water layer of tears is inadequate. This condition, called keratoconjunctivitis sicca (KCS), is also referred to as dry eye syndrome. People with dry eyes may experience irritated, gritty, scratchy or burning eyes; a feeling of something in their eyes; excess watering; and blurred vision. Advanced dry eyes may damage the front surface of the eye and impair vision.¹

Dry eye syndrome is caused by a chronic lack of sufficient lubrication and moisture on the surface of the eye. Consequences of dry eyes range from subtle but constant eye irritation to significant inflammation and even scarring of the front surface of the eye. In addition to being called dry eye syndrome, dry eye disease, or simply "dry eye," alternative medical terms used to describe dry eyes include Keratitis sicca it is Generally used to describe dryness and inflammation of the cornea, Keratoconjunctivitis sicca it is Used to describe dry eye that affects both the cornea and the conjunctiva, and Dysfunctional tear syndrome it is Used to emphasize that inadequate quality of tears can be just as important as inadequate quantity.²

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Typical symptoms of dry eye syndrome are dryness, burning and a sandy-gritty eye irritation that gets worse as the day goes on. Symptoms may also be described as itchy, scratchy, stinging or tired eyes. Other symptoms are a pain, redness, a pulling sensation, and pressure behind the eye. There may be a feeling that something, such as a speck of dirt, is in the eye. The resultant damage to the eye surface increases discomfort and sensitivity to bright light. Both eyes usually are affected. There may also be a stringy discharge from the eyes. Although it may seem strange, dry eye can cause the eyes to water. This can happen because the eyes are irritated. One may experience excessive tearing in the same way as one would if something got into the eye.

These reflex tears will not necessarily make the eyes feel better. This is because they are the watery type that is produced in response to injury, irritation, or emotion. They do not have the lubricating qualities necessary to prevent dry eye.

Because blinking coats the eye with tears, symptoms are worsened by activities in which the rate of blinking is reduced due to prolonged use of the eyes. These activities include prolonged reading, computer usage, driving, or watching television. Symptoms increase in windy, dusty or smoky (including cigarette smoke) areas, in dry environments high altitudes including airplanes, on days with low humidity, and in areas where an air conditioner (especially in a car), fan, heater, or even a hair dryer is being used. Symptoms reduce during cool, rainy, or foggy weather and in humid places, such as in the shower. Most people who have dry eyes experience mild irritation with no long-term effects. However, if the condition is left untreated or becomes severe, it can produce complications that can cause eye damage, resulting in impaired vision or (rarely) in the loss of vision.

Symptom assessment is a key component of dry eye diagnosis - to the extent that many believe dry eye syndrome to be a symptom-based disease. Several questionnaires have been developed to determine a score that would allow for dry eye diagnosis. The McMonnies & Ho dry eye questionnaire is often used in clinical studies of dry eyes. Dry eyes can usually be diagnosed by the symptoms alone. Tests can determine both the quantity and the quality of the tears. A slit lamp examination can be performed to diagnose dry eyes and to document any damage to the eye. A Schirmer's test can measure the amount of moisture bathing the eye. This test is useful for determining the severity of the condition. A five-minute Schirmer's test with and without anesthesia using a Whatman #41 filter paper 5 mm wide by 35 mm long is performed.

For this test, wetting under 5 mm with or without anesthesia is considered diagnostic for dry eyes. If the results of the Schirmer's test are abnormal, a Schirmer II test can be performed to measure reflex secretion. In this test, the nasal mucosa is irritated with a cotton-tipped applicator, after which tear production is measured with a Whatman #41 filter paper. For this test, wetting under 15 mm after five minutes is considered abnormal. A tear breakup time (TBUT) test measures the time it takes for tears to break up in the eye. The tear breakup time can be determined by placing a drop of fluorescein in the cul-de-sac. A tear protein analysis test measures the lysozyme contained within tears.

In tears, lysozyme accounts for approximately 20 to 40 percent of total protein content. A lactoferrin analysis test provides good correlation with other tests. The presence of the recently described molecule Ap4A, naturally occurring in tears, is abnormally high in different states of ocular dryness. This molecule can be quantified biochemically simply by taking a tear sample with a plain Schirmer test. Utilizing this technique it is possible to determine the concentrations of Ap4A in the tears of patients and in such way diagnose objectively if the samples are indicative of dry eye. The Tear Osmolarity Test has been proposed as a test for dry eye disease. Tear osmolarity may be a more sensitive method of diagnosing and grading the severity of dry eye compared to corneal and conjunctival staining, tear break-up time, Schirmer test, and meibomian gland grading. Others have recently questioned the utility of tear osmolarity in monitoring dry eye treatment.³

There are a number of options. Treatments include Artificial tear drops and ointments. This is the most common treatment. Many types of drops are available over the counter. No one product works for everyone, so you might have to try a few to figure out the one that's right for you. If there chronic dry eye, need to use the drops even when your eyes feel fine, or they won't stay wet enough. If eyes dry out while sleep, can use a thick product, like an ointment, at night.⁴

Mobile phone usage and its addiction found one of the most common prevalent addictions currently exists. And also reported that these people will prefer to live separately. Moreover, this addiction can lead to huge financial and psychological loss at the individual level as well as community level (5). Cellular Phone and video Games have a negative effect in dry eye syndrome and eye. It became the use of the mobile phone of things, which is prevalent in our world significantly and that a person may use more than one mobile phone, but that the children also became their mobile phones too.⁶ Dry eye syndrome is associated with a measurable adverse impact on several common and important tasks of daily living such as excessive use of mobile phone, further implicating this condition as an important public health problem deserving increased attention and resources⁷

1.2. Literature Review

A study was done by Park, et al⁶. The sample size of this study was Sixty university students were randomly assigned to either a video or a game group and Thirty subjects watched cellular phone video programs and the other 30 subjects played cellular phone games for 61 minutes. This study showed that using cellular phone has a negative influence on dry eye syndrome and eyes require a resting period after cellular phone use over 40 minutes.

In another study, was done by Moon, et al.⁸ Twenty-eight children were included in the dry eye disease group and 260 children were included in the control group. Gender and best-corrected visual acuity were not significantly different between the two groups. Smartphone use was more common in the dry eye disease group (71%) than the control group (50%) ($P = .036$). The daily duration of smartphone use and total daily duration of video display terminal use were associated with increased risk of dry eye disease ($P = .027$ and $.001$, respectively), but the daily duration of computer and television use did not increase the risk of dry eye disease ($P = .677$ and $.052$, respectively).

A study in America was done by Biljana et al.⁷ The sample size of this study was 135 work health and safety and 55 public health service participants with dry eye syndrome, and 250 work health and safety and 149 public health service participants without dry eye syndrome. The study showed that dry eye syndrome is associated with a measurable adverse impact on several common and important tasks of daily living.

A study was done by Kazuo, et al.⁹. The results showed a dramatic increase (from 5.6 ± 3 to 9.1 ± 4.9 [$P < .0001$]) in blinks/minute with use of the protective sheet. The study showed The protective sheet has shown the possibility of increasing the blink rate by making the screen easier to see.

A study was done by Richard, et al.¹⁰. The sample size was identified subjects who used computers 3 hours or more per day. This study showed Computer users with ocular surface complaints should have a detailed ocular surface examination.

A study was done by Moon, et al.¹¹ The sample size of this study was 916 children. This study showed Smartphone use in children was strongly associated with pediatric; however, outdoor activity appeared to be protective against pediatric. Older-grade students in urban environments had risk factors (long duration of smartphone use), and a short duration of outdoor activity time. Therefore, close observation and caution are needed when older children in urban areas use smartphones.¹¹

A study was done by Han.¹² The sample size of this study was 657 individuals 65 years or older randomly selected from an official household registration database. This study showed dry eye disease is common in elderly Koreans; female sex and living in an urban region were strongly correlated with its frequency.

1.3. Rationale for the Study

Dry eye is a condition in which a person doesn't have enough quality tears to lubricate and nourish the eye. Tears are necessary for maintaining the health of the front surface of the eye and for providing clear vision. A study in Oman about dry eye are rare. This study was chosen to determine if there is any effect on the eye when using a mobile phone and video game can cause dry eye among university student in Buraimi, To know the extensive of visual symptoms, and To assess the visual status. Most of the studies that were done show that using a mobile phone and video game a lot can cause dry eye.

3. RESULTS

The obtained data involves: A total of 60 patient's data were analyzed and the results are as follows:

As shown in table.1: the results of four groups comparing the various visual acuity. Group analysis showed with the type of dry eye with tears breakup time with different visual acuity, in that minimum tears breakup time found in the parson which visual acuity 6\60. whereas maximum was found in the parson which visual acuity 6\6.

Table1. Visual acuity vs Tear Stability Analysis by tears breakup time (TBUT)

Visual acuity	Tears breakup time (TBUT)				
	Normal	Abnormal	Borderline dry eye	Dry eye	Total
6\6	28 (60.8%)	7 (15.2%)	6 (13%)	5 (10.8%)	46
6\7.5	10(62.5%)	4 (25%)	2 (12.5%)	-	16
6\9.5	5 (35.7%)	4 (28.5%)	3 (24.4%)	2(14.2%)	14
6\12	4 (40%)	3 (20%)	2 (20%)	1 (10%)	10
6\24	2 (50%)	1 (25%)	1 (25%)	-	4
6\30	3(50%)	2(33.3%)	1(16.6%)	-	6
6\38	2 (66.6%)	1(33.3%)	-	-	3
6\60	0 (0%)	1(100%)	-	-	1

1.4. Aim of Study

To investigate the effect of mobile phone use among University students in Buraimi.

2. MATERIALS AND METHODS

2.1. Materials and Methods

The cross-sectional survey was conducted to assess the effect of Cellular Phone and video Games on Dry Eye Syndrome among University Students in Buraimi. The sample size was estimated in the study (100). The participants were randomly selected and the study was conducted in a standard optometry set up. Prior to the examination, informed consent was taken from the selected participants. The study was approved by research and ethical committee of the college of health science, University of buraimi. After the consent, the purpose of the study and the examination procedure and the adverse events were explained to the subjects prior to the examination. The examination includes history taking, Schirmer test and but were performed to check the status of the tear film to ensure subjects having dry eye or not. History was taken to obtain the information related to knowing if patient has any problem in their eye can also identify the parts of the clinical examination that need special attention and mainly to find out the visual symptoms and ergonomics, visual acuity to know if patient emmetropic or ammetropic, Tear volume measured by using schrimmer test to assess the tear production. In this test, blotting strips of paper are placed under the lower eyelids with and without using local anesthetic drops (Schirmer test-I and II). After five minutes measures the amount of strip soaked by your tears. Finally, The TBUT test remains one of the most important global tests to diagnose dry eye.

INCLUSION CRITERIA

1. Age between 18 -25 years above
2. Mobile phone users
3. Male subjects
4. Female subjects
5. Emmetropes
6. Ammetropes

EXCLUSION CRITERIA

Age less than 18 and above 25 years

1. Ocular pathology
2. Systemic disease

2.2. Data Analysis

The data was analyzed using Microsoft office excel 2010 Descriptive statistics was used to analyze the data

In figure.1 reveals the results of the estimate of the time the parson spends on a mobile phone in a day, A total of 100 sample size were taken for the purpose of analysis. Out of that, the analysis showed in the maximum percentage of using mobile phone More than 10 hours in a day and the minimum percentage of using the mobile phone less than 1 hours, was found in the male and female group.

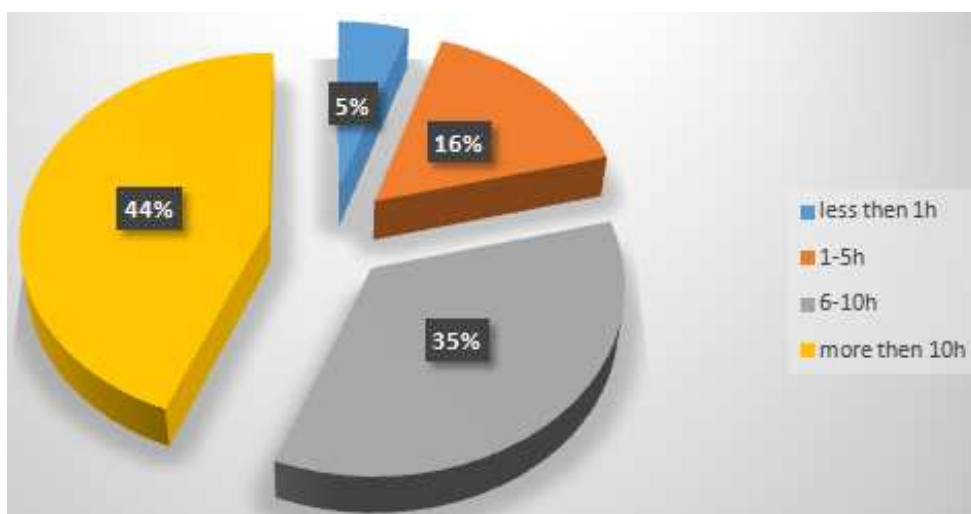


Figure1. estimate of the time the parson spends on a mobile phone in a day.

As shown in Figure2 the result found that the higher percentage of participant's normal range of tears in female (62.8%).The participants that the least percentage of participants an inadequate range of tears in male (16%).



Figure2: Tear volume assessment by using schirmer test to assess the tear production in the male and female group

The statistic was founded shows that majority of females and male tears stability between age 19-23 age which normal tears more that 58% in age between 22-23, while those who are 18-19 age have a minimum percentage of normal tears. On another hand, the maximum dry eye found between age 18-19 which 13%.

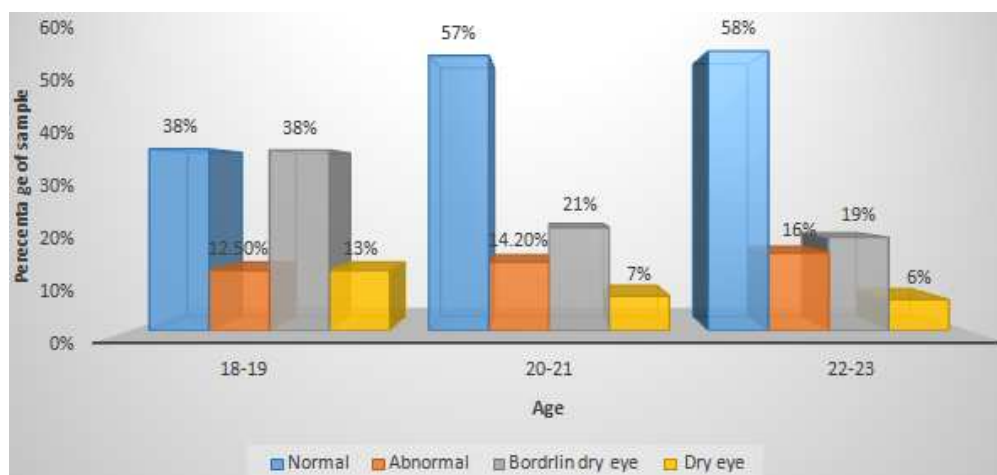


Figure3 Age VS Tear Stability Analysis

Around 31.4% female students have dry eye but around 28% male students have dry eye.

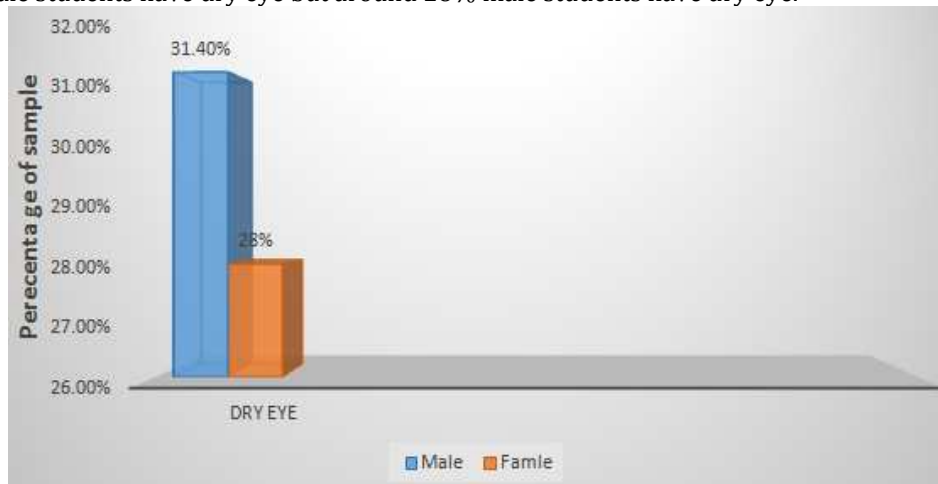


Figure4 Frequency of dry eye in the students

4. DISCUSSION

4.1. Discussion of the Findings

The study aimed to investigate the effect of mobile phone use among University students in Buraimi. A total of 100 sample size between 18-25 age were taken for the purpose of analysis. The finding is that using a cellular phone and video game has a negative influence on dry eye syndrome which 42% of sample size Smartphone use was more common in the dry eye disease. The tear stability is related to visual acuity which the normal visual acuity 6\6 meters of 20\20 feet have the lowest chance of dry eye disease. The present study finding was similar to the finding conducted by Park, et al.⁶. This study showed that using cellular phone has a negative influence on dry eye syndrome and eyes require a resting period after cellular phone use over 40 minutes. Another study supports my study that reveals the same result from the level practice by Moon, et al.⁸ Smartphone use was more common in the dry eye disease group (71%) than the control group (50%) ($P = .036$). The daily duration of smartphone use and total daily duration of video display terminal use were associated with increased risk of dry eye disease ($P = .027$ and $.001$, respectively). The other study by Moon, et al.¹¹ This study showed Smartphone use in children was strongly associated with pediatric; however, outdoor activity appeared to be protective against pediatric. Older-grade students in urban environments had risk factors (long duration of smartphone use), and a short duration of outdoor activity time. Therefore, close observation and caution are needed when older children in urban areas use smartphones.

4.2. Recommendations for Further Study

To conduct the study on a larger population to understand if there is any effect on the eye when using a mobile phone and video game can cause dry eye, And to know the extensive of visual symptoms, and to assess the visual status. Most of the studies that were done show that using a mobile phone and video game a lot can cause dry eye.

5. CONCLUSION

This study shows that using a cellular phone and video game has a negative influence on dry eye syndrome.

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Appendices:

- A. Consent form
- B. Clinical data form

Clinical Data Form

Age: Date:

Sex: Male () - Female ()

Dry eye syndrome, also known as keratoconjunctivitis sicca, is the condition of having dry eyes. Other associated symptoms include irritation, redness, discharge, and easily fatigued eyes. Blurred vision may also occur. The symptoms can range from mild and occasional to severe and continuous. Scarring of the cornea may occur in some cases without treatment. Dry eye occurs when either the eye does not produce enough tears or when the tears evaporate too quickly. Many time we face such situation. For example, while exposure to air-conditioned or during using a mobile phone for a long time. Our study aims to investigate the effect of mobile phone use among University students in Oman.

Kindly make some tests for the eye and answer questions raised during the examination. If you agree to participate in the study without any opposition. Please sign in below.

Signature:

Eye examination**History:**

Medical history	
General history	
Ocular history	
Ocular surgical history	
Medication history	
Family history	

Q1. What is the total estimate of the time you spend on your mobile phone in a day?

- Less than 1 hour
- Between 1 to 5 hours
- Between 6 to 10 hours
- More than 10 hours

Visual acuity:

Vision	OD	OS
Unaided		
Aided (pinhole)		

Tear Volume assessment:**Schirmer Test**

Tear volume will be measured by using schirmer test to assess the tear production. In this test, blotting strips of paper are placed under your lower eyelids with and without using local anesthetic drops (Schirmer test-I and II). After five minutes your doctor measures the amount of strip soaked by your tears.

Eye	Right	Left
Schirmer Testmmmm

Result:

- 15-25mm = Normal range
- 10-14mm = Low tears
- Less 10mm = Inadequate tears

Tear stability Analysis:

Fluorescein Tear Break-up Time (TBUT)

The TBUT test remains one of the most important global tests to diagnose dry eye, yet reliable cut-points have not been established

Eye	Right	Left
TBUT Secs Secs

Result:

- Values more than 10s are considered normal
- Values of =10s are considered abnormal
- Values of 5-9s are borderline dry eye
- Values of less than 5 are clearly indicative of dry eye