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Correlation Between Dry Eye and Screen Viewing Time Among Young Adult

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Abstract

Screen use especially computers, phone and other visual display devices are now an essential part of our daily life. With the increased use, a large population is experiencing ocular symptoms globally such as dry eyes, eye strain, irritation and redness of the eyes. This study determined the correlation between dry eye and screen viewing time among young adult in Madonna university teaching hospital. This is an observational cross-sectional study with 100subjects. 50(50%) male and 50 (50%) female within the ages of 18-32years. A total of 100 questionnaire were collected, quantitative approach was used to determine dry eye using schimer's strip and the data were analyzed using Pearson chi-square. The study discovered the percentage of age group of the participant which 53(53%) fell within 23-27 years with 28(28.0%) males and 25(25%) females, while 18-22years 38(38%) with 18(18%) males and 20(20%) females, 28-32years 9(9.0%) in which 4(4.0%) were males and 5(5.0%) were females. The study showed that the mean age was 23.18 and standard deviation of ±3.160. The mean and standard deviation gotten for dry eye were 21.43±10.96. The study also showed the screen viewing time distribution among the participants within the duration of 4-6hours as the highest occurring duration with 38(38.0%), while 7-9hours was 25(25%), 1-3hours was 19(19%) and above 9hours with the least 18(18%) with the total mean of 1.42 and standard deviation ± 0.997. Correlation between dry eye and screen time in respect to gender, for screen viewing time above 9hours were ($p=0.00$, $p<0.05$) while correlation between dry eye and screen viewing time in relation to age group from 18-22years were ($p=0.051$, $p< 0.05$), 23-27years ($p=0.017$, $p<0.05$) and 28-32 ($p=0.126$, $p<0.05$) with the total Pearson chi-square of 0.00 ($p=0.00$, $p<0.05$). In conclusion there is statistical correlation between dry eye and screen viewing time especially for constant screen users. The researcher recommends proper orientation and institutional education on screen usage especially for constant users.

Keywords: Correlation, dry eye, screen viewing time, young adult

Introduction

The eye is a compound optical system composed of cornea and lens. It is also an adaptive optical system because the crystalline lens changes shape to focus light from object at large range of distances on the retina **[1]**. The human eyes are made up of various part which tear film is one of them, which helps in secretion of tears. The ocular surface is an integrated anatomical unit consisting of 7 key interactive and inter dependent components, the tear film, the lacrimal and accessory lacrimal apparatus, the naso-lacrimal drainage system, the eyelids, the bulbar and tarsal conjunctiva, cranial nerve v and vii. Abnormalities or deficiencies in any of the 7

ocular surface components may worsen dry eye disease **[2]**.

The tear film is a well-organized moist film which covers the bulbar and palpebral conjunctiva and cornea, which is formed and maintained in an elaborate system that comprises the lacrimal apparatus interface.

Tears have similar structure to saliva and mostly made of water but also contain salt, fatty oils and over 1500 different proteins **[3]**. Tear dysfunction is one of the most common problems encountered by eye doctors resulting from disease of one or more component of lacrimal functional unit that consist of the tear producing glands and their neural connection. It has a reported prevalence ranging with age from the 4^{th} and 8^{th} decade of life and more prevalent in women than men **[4]**, it forms a thin layer over the cornea and conjunctiva which is also known as precorneal tear film. Guillion and Cecile **[5]** conducted a study on effect of age, gender and tear film evaporation, a total of 160 subject less than 45years or more were used as the study population. The result revealed a significant effect of age ($P<0.001$), gender ($P< 0.001$) and the interaction ($P<0.001$). The rate of evaporation was higher in older age group at both humidity the rate of evaporation was overall higher for women and the synergic effect of age and gender was very marked. Dry eye disease is a chronic ocular pathology and a major global health problem that manifest a plethora of symptoms such as burning, photophobia, tearing and grittiness **[6]**.

Tityal and Kumar **[6]**, conducted a study on 15625 patients, were OSDI questionnaire were administered over a period of 2years clinically dry eye disease was detected in 32% patient. 9.8% mild dry eye,61.2% had moderate dry eye disease and 28.9% severe dry eye disease and the questionnaire consist of 12 questions were 1.58% answered 11, 32.34% answered 10 questions, 0.08% answered 9 questions. In another study conducted by Agbonlahor **[7]**, the prevalence of computer vision syndrome among working class in F.C.T was calculated to be 65%. Prevalence of computer vision syndrome was highest in female gender 74% as compared to male 56%. Association between the dependent variable (presence of computer vision syndrome) and most of the independent variable were not statically significant; the only association that was statistically significant was presence of computer vision syndrome with knowledge of computer vision syndrome (x^2.7.748; df:1; p = 0.005), and presence of computer vision syndrome with work productivity (x^2: 6.641, df :2; p = 0.036).

Mufti, sheikh and Sania **[8]**, conducted a study on prevalence rate of dry eye on 100 undergraduate medical student department of physiology, government medical college which shows that increased duration of usage of digital screen increases the risk of dry eye. Eye strain was the most common symptom reported by 53 subjects (58.8%) followed by headache (23.3%) followed by blurring of vision. 37% of the students had never heard of dry eye whereas 53% had some knowledge about it. 62% of the students believed that digital screen exposure affects their lifestyle majority of students 75% were willing to reduce their screen time as a preventive measure towards dry eye. Computer vision use has become worldwide. One side of these technology made our lifestyle too much relaxed but on the other side produce many dangers for human health which increases day by day. In increasing the use of computers in homes or offices as well as professional and educational life there is a requirement to explore whether students, professional and other computer users as implement ergonomic principles when they are using these devices **[9]**.

Screen time is the amount of time spent using device with a screen such as a smart phone, computer, television or video game. Studies shows that screen time directly impact child development, mental and physical health. Screen time may represent a significant risk factor for dry eye syndrome in children with symptoms of tearing, eye redness, eye rubbing and headache which may indicate screen time associated dry eye within the pediatric population **[10]**. Computer vision syndrome is applied collectively to set of different symptoms in computer use who are either habitually or on compulsion are using computers for a long time during the day and night **[11]**. Moldovan et al., **[12]**, conducted a study on the correlation between pc screen exposure of over 8hrs and dry eye syndrome in 18-25years, among 59 participant of this study 26 were exposed 8hours of Pc screen exposure=exposed and 33 were not exposed which indicate that dry eye syndrome incidence and intensity of symptoms increases proportionally with hours.

American optometry association recommends that the center

of the computer monitor should be approximately 10-12.5m below eye level and it should be 50-70cm away from the eye, with 15minutes of rest after 2hours of work. The use of the 20-20-20 rule reduces eye strain, take a break every 20minutes by looking at an object 20 feet away for 20 seconds. Severe dry eye syndrome may result in cornea erosion and secondary infection that may lead to vision loss. However current clinical evaluation such as tear break up test and schimers test may not be sufficient for accurate diagnosis of dry eye syndrome **[13]**. In testing for TBUT, sodium fluorescein dye is added to the eye and tear film is observed under the slit lamp while patient blinking until tiny dry spot develop.

Lemp et al., **[14]**. illustrates that patients with mild and moderate dry eye have broadly distributed TBUT value making it different to differentiate them from normal subjects. Automation TBUT involves location of different areas from a video for tear film deterring regress of interest and measurement of break up time which is determined by a trained expert observer. Yui et al **[15]**, indicate that screen time in school children is related to obesity, physical activity, dry eyes and learning ability and they suggest that not only duration but also the timing of screen time is important.

Tear film stability is the most important indication of tear film dysfunction, reduced tear film stability as well as increased osmolarity are hallmarks of all forms of dry eye **[16]**. Tear film stability can be influenced by external environmental conditions, such as temperature, humidity, air-conditioning, air pollution, including smoke and other atmospheric irritants, and even air currents **[17-18]**. It can also be affected by daily activities and alcohol intake. The symptoms of dry eye such as headache, eyestrain, watery eyes, blurry vision, discomfort are daily complaints of screen users both smart phone users and computer users. The researchers work tend to examine time among young adults, to realize the negative effect of light from screen on the eyes which result to dry eye and other ocular complaint. This study involves correlation between dry eye and screen viewing time amongst young adult irrespective of the gender, between the ages of 18 and 32years at optometry clinic, Madonna university, Rivers state. The study is significant at it will create awareness on the possible effect of screen viewing time on the eyes. It will help to enlighten the public on how well to protect their eyes from screen rays to avoid further eye complication like dry eye. It will help to educate the public how necessary it is to stay away from screen after over usage of screen. It will also educate the public on how important it is to visit an eye doctor in case of any discomfort.

Research Questions

This research design aims at providing answers to the following questions.

- What would be the effect of screen viewing time on dry eye on young adults?
- What could be the relationship between dry eye and screen viewing time in relation to gender
- What could be the relationship between dry eye and screen viewing time in relation to age?
- What could be the effect of screen viewing time on dry eye in relation to hours?

Research hypothesis

The study focuses on the testing the following research hypothesis.

Null hypothesis (H_{O1}): There is no statistically significant correlation between dry eye and screen viewing time among young adults.

Alternate Hypothesis (H_{A1}): There is a statistically significant correlation between dry and screen viewing time. ($P < 0.05$).

Materials and method

Legal and ethical consideration:

Ethical consent was obtained from the ethical committee of the department of optometry, Madonna university Nigeria, Elele, Rivers State. Verbal consent was obtained from the participant with their right duty protected. Confidentiality of the data was maintained.

Research design and Area of Study:

The research design is observational cross-sectional study. And the area of study is Madonna University teaching hospital Elele, Rivers state. Elele town is situated in Ikwerre Local government Area, River's state, Nigeria. Madonna University teaching hospital Consists of different units and department's with well qualified medical practitioners with about 7300 patients and Students, the eye clinic as the state-of-the-art equipment's and it provides a clinical atmosphere

needed for the study.

Study Population:

This research study utilized a total number of 100 healthy volunteer, young adults between ages of 18-32 years. The selection was made up of 50 females and 50 males all were both patients and student of Madonna University teaching hospital Elele, River's state

Inclusion & Exclusion Criteria:

Young adults from 18-32years in Madonna University who were willing to participate, those using a smart phone for more than one year and young adult 18-32years who didn't give their consent were included in the study. While young adults 18-32 years with ocular surface pathologies such as meibomian gland diseases, pterygium and pinguecula, those using eye drop and those with history of ocular trauma were excluded from the study.

Sampling size/sampling technique:

A convenient sample size of 100 subjects was used for this study. Convenience sampling technique was used for this study. The following materials were used for data collection; Pentorch, Schimer strip, Ophthalmoscope Screen, Time piece and Questionnaire.

Procedure for data collection:

Case history was taken; external eye examination and internal eye examination (with direct distance ophthalmoscope) was done to confirm there was no ocular surface pathologies that will alternate the result. Samples were examined to check their production quantity using schimer test before they used their screen. Subsequently measurement of samples continued after making use of the screen. The measurement time interval is 5minutes. Data were collected quantitatively since the tear production was measured numerically for statistical analysis. All the clinical measurement were carried out in a single non-air-conditioned room with constant temperature and humidity. Tear film quantity was tested by schemers test. The strip was folded 5mm from one end and kept in the lower fornix of both eyes at the junction of lateral one third and medial 2/3 after 5minutes the strips were removed, and the length of filter paper wetted was noted in mm.

Data Analysis:

Statistical package for social sciences (IB SPSS version 21.0) software was used to analyse the data collected from the 100 subjects that were tabulated. Paired sample t-test was used to compare baseline measurements with measurements for other reading conditions after 1 minute. Correlation between blink parameters and tear parameters were derived using Pearson's and Spearman's test for data with normal and non- normal distributions, respectively. Level of statistical significance was set at 5%.

Reliability And Validity:

In this study, all data were collected by the researcher alone, hence no inter-ratter influence. All the data that was presented in this study was exactly the same situation and phenomenon. Efforts were made to ensure accuracy of data. Also, the data for this study was collected using some tests and the instruments used was approved by the optometric and dispensing optician regulatory board of Nigeria (ODORBN) and the procedures were performed under standard optometric conditions.

Results

The respondents were asked to indicate their gender. Result in the **table** above shows 50(50%) of respondents were females, 50(50%) males. The first question of the questionnaire was to profile the selected participants in terms of their age.

Table 4.1: Gender of Participants

GENDER				**AGE GROUPS**		
		N	%	Range	**N**	**%**
	MALE	50	50.0	18-22 years	38	38.0
	FEMALE	50	50.0	23-27 years	53	53.0
	Total	100	100.0	28-32 years	9	9.0
				Total	100	100.0

The **table** above shows the age group of the participants which ranged from 18 to 32years in which 53(53) % fell within 23-27years in

which 28(28.0%) were males and 25(25.0%) were females, 38(38.0) % within 18-22years in which 18(18.0%) were males and 20(20.0%) were females, 9(9.0) % within 28-32years in which 4(4.0%) were males and 5(5.0%) were females, with the mean age of 23.18 and SD of ± 3.160

Table 4.2: Gender Distribution among Age Groups.

AGE GROUP	GENDER				
	MALE		FEMALE		Total
Range	N	%	N	%	
18-22 years	18	18.0	20	20.0	38
23-27 years	28	28.0	25	25.0	53
28-32 years	4	4.0	5	5.0	9
Total	50	50.0	50	50.0	100

The first question of the questionnaire was to profile the selected participants in terms of their age. **Table 3** shows the gender distribution among age group from 18 to 32years in which 53(53)% fell within 23-27years in which 28(28.0%) were males and 25(25.0%) were females, 38(38.0)% within 18-22years in which 18(18.0%) were males and 20(20.0%) were females, 9(9.0)% within 28-32years in which 4(4.0%) were males and 5(5.0%) were females, with the mean age of 23.18 and SD of ± 3.160.

Table 4.3: Showing the Distribution Respondents by Education

LEVEL OF EDUCATION		
	N	%
PRIMARY	0	0.0
SECONDARY	2	2.0
TERTIARY	98	98.0
NO EDUCATION	0	0
Total	100	100.0

Level of Education

Results obtained show that 0% of the respondents had primary education and as well as uneducated, a fact worth noting is that 100% of all respondents have good level of education, 2% have secondary education and 98% have attended colleges and university education. The data gathered from the field work on the level of education of the participants is presented above

Table 4.4: Descriptive Statistics of Demographical Data

TA	Mean	Std. Deviation	Variance	Minimum	Maximum	Sum
GENDER	0.50	0.503	0.253	0	1	50
AGE GROUP	0.71	0.624	0.390	0	2	71
LOE	1.98	0.141	0.020	1	2	198
AGE	23.18	3.160	0.020	18	32	2318

Table 4.5: Showing the Distribution Type of Screen Owned

	PHONES		DESKTOPS		PALMTOPS		COMPUTERS		LAPTOPS	
	N	%	N	%	N	%	N	%	N	%
YES	98	98.0	4	4.0	5	5.0	4	4.0	77	77.0
N0	2	2.0	96	96.0	95	95.0	95	95.0	23	23.0
Total	100	100.0	100	100.0	100	100.0	100	100.0	100	100.0

Screen use distribution among participants: All the participants for the study had at least one or more gadgets, 98% used phone

while 77% used laptops, the others and their frequency and percentage are represented in the **table 6** above.

Table 4.6: Showing the Distribution of the Duration of Screen usage

Duration	N	%
Valid	26	26.0
1-5 years	54	54.0
6-10 years	20	20.0
11-15 years	100	100.0
Total		

Screen use distribution among participants: Result obtained showed that 54% of the participants have been using a screen for 6-10 years, 26% for 1-5years and 20% for 11-15years, these are presented in **table** above.

Table 4.7: Showing Screen Viewing Time Distribution among Participants

SCREEN VIEWING TIME		
Range	**N**	**%**
1-3 hours	19	19.0
4-6 hours	38	38.0
7-9 hours	25	25.0
above 9 hours	18	18.0
Total	100	100.0

Screen viewing time: This was gotten from the average duration of screen usage in a day in the questionnaire, with the duration of 4-6hours as the highest occurring duration 38(38.0%), while 7-9hours was 2k5(25.0%), 1-3hours was 19(19.0%) and above 9hours as the least 18(18.0%), with the Mean of 1.42 ± Std. Deviation 0 .997. This **table** above shows that most of the participants spends 4-6hours on the screen followed by 7-9 hours, with the list duration being above 9hours

Table 4.8: Showing Grading of the Schimer's Values

GRADING OF SCHIMERS VALUE		
Range	**Frequency**	**Percent**
DRY EYE	26	26.0
NORMAL	74	74.0
Total	100	100.0

Dry eye: Dry eye was determined using schimer test in which 0-10mls indicates dry eye. According to the Schimer's test value gotten 26 participants had dry eye value while 74 had normal value in the **table** above.

Table 4.9: Showing descriptive statistics of Schimer's values

	Mean	Std. Deviation	Variance	Range	Minimum	Maximum	Sum
SCHIMERS VALUE	21.43	10.963	120.187	35	0	35	2143

Dry eye was determined using schimer test in which 0-10mls indicates dry eye. According to the Schimer's test the highest occurring Schimer's value of 30mls and a Mean of 21.43± Std. Deviation of 10.96 in the **table** above.

Table 4.10: Showing Dry Eye and Screen Viewing Time Relation

SCREEN VIEWING TIME	GRADING OF SCHIMERS VALUE		Total
	DRY EYE	NORMAL	
Range	N %	N %	
1-3 hours	0 0.0	19 19.0	19
4-6 hours	6 6.0	32 32.0	38
7-9 hours	12 12.0	13 13.0	25
above 9 hours	8 8.0	10 10.0	18
Total	26 26.0	74 74.0	100

Dry eye and screen time

According to the **table** above, 0 out of the 19 participants who spend 1-3hours on their screen have dry eye, while for those who spend 4-6hours 6 out of 38 have dry eye, 12 out of 25 of the participants who spend 7-9hours have dry eye and 8 out of the 18 participants with above 9 screen time record have dry eye.

Table 4.11: Showing Dry Eye and Screen viewing Time in Relation to Gender

GENDER		SCREEN VIEWING TIME				Total
		1-3 hours	4-6 hours	7-9 hours	above 9 hours	
MALE	DRY EYE	0	4	6	1	11
FEMALE	DRY EYE	0	2	6	7	15
	Total	0	6	12	8	26

Dry eye and screen viewing time in relation to gender

Gender distribution of the effect of screen viewing time on dry eye as stated in the **table** above shows that males had dry eye more than females for the screen duration of 4-6hours, an equal distribution for those within screen time group of 7-9hour and females had higher distribution than males for screen viewing time.

Table 4.12: Showing Dry Eye and Screen viewing Time in Relation to Age Groups

AGE		SCREEN VIEWING TIME				Total
		1-3 hours	4-6 hours	7-9 hours	Above 9 hours	
18-22 YEARS	DRY EYE	0	4	2	1	7
23-27 YEARS		0	2	8	5	15
28-32 YEARS	DRY EYE	0	0	2	2	4
Total	DRY EYE	0	6	12	8	26
	Total	0	12	24	16	52

Dry eye and screen viewing time in relation to age group

Age group distribution of the effect of screen viewing time on dry eye as stated in the **table** above shows that those within the age group of 18-22 had the highest distribution of dry eye for the screen duration of 4-6hours, for those within 23-27years had higher frequency for screen time groups of 7-9hour and above 9 and those within 28-32 had equal distribution for both 7-9hours and above 9hours.

Table 4.13: Showing Chi-Square Tests for Dry Eye and Screen Time

	Value	Df	P value
Pearson Chi-Square	18.206[a]	3	0.000

Correlation

This study analyzed the relationships that are inherent among the independent and dependent variables as well as among the independent variables/ factors. The results regarding this were summarized and presented in **table** above. Pearson Correlations results in **table** above showed that there is an effect on dry eye in relation to screen time (p=0.00, ρ<0.05).

Table 4.14: Showing Chi-Square Tests for Dry Eye and Screen Time in Relation to Gender

SCREEN TIME AND GENDER		Value	Df	P value
1-3 hours	Pearson Chi-Square	.[c]		
4-6 hours	Pearson Chi-Square	0.038[d]	1	0.846
7-9 hours	Pearson Chi-Square	0.037[e]	1	0.848
above 9 hours	Pearson Chi-Square	5.951[f]	1	0.015
Total	Pearson Chi-Square	0.832[a]	1	0.362

Table above it also shows correlation between dry eye and screen time in respect to gender for the screen time of above 9hours (p=0.00, ρ<0.015).

Table 4.15: Showing Chi-Square Tests for Dry Eye and Screen Time in Relation to Age Groups

AGE		Value	Df	P value
18-22 years	Pearson Chi-Square	7.791[b]	3	0.051
23-27 years	Pearson Chi-Square	10.153[c]	3	0.017
28-32 years	Pearson Chi-Square	4.140[d]	2	0.126
Total	Pearson Chi-Square	18.206[a]	3	0.000

Correlation: The results regarding this were summarized and presented in **table** above. Dry eye and screen time in relation to age group show a correlation for 18-22 YEARS (p=0.051, ρ<0.05) and 23-27 YEARS (p=0.017, ρ<0.05) except for 28-32 YEARs (p=.126, ρ<0.05) with the Total Pearson Chi-Square of 0.000 (p=0.00, ρ<0.05).

Discussion

The focus of this study was to determine the correlation between dry eye and screen viewing time among young adults in Madonna University. The findings revealed that both genders were equally represented, 50(50%) of the respondents were female the same with male 50(50%) this distribution is different from that Faruqul and Agawuwal **[19]** in the study of the correlation between smartphone usage and dry eye in medical students at a tertiary care center in which there were 160 males (40.75%) and 234 females 59.24% which shows an unequal gender distribution. The respondents were aged between 18 to 32years this age range is almost similar to that of Agbonlahor (2019) where the respondents were aged between 18-35 years. The majority of respondents namely 100% of all respondents had good level of education, 2% have secondary education and 98% have attended colleges and university education, 0% of the respondents had primary education and as well as uneducated. This is similar to the study by Moldovan et al, **[12]** among 59 participant 33 were non exposed.

Majority of the participants 98% used phone while 77% used laptops, the others and their frequency and percentage are represented in the **table 6**, 54% of the participants have been using a screen for 6-10 years, 26% for 1-5years and 20% for 11-15years. Screen viewing time among participants in this studied revealed that 4-6hours was the highest occurring duration 38(38.0%), while 7-9hours was 25(25.0%), 1-3hours was 19(19.0%) and above 9hours as the least 18(18.0%). This shows that most of the participants spends 4-6hours on the screen followed by 7-9hours, with the least duration being ab0ve 9hours, which could be as a result of the need to be in lectures for 8-9hours a day this is similar to the findings of Faruqui et al **[19]**, that shows that students who used smart

phones for more than 3hours per day had a higher risk of heaviness (OR 2.042, p=0.0005), blurring (OR 1.96, p=0.0013), fatigue (OR 1.55, p=0.03), dryness (OR 1.708, p=0.39) and photophobia (OR 1.72, p=0.01) than those who uses it less than 3hours per day.

Dry eye was determined using Schimers test in which 0-10mls indicates dry eye. According to the Schimers test value gotten, 26 participants which was 26% of the participants had dry eye value. Study by Faruqui et al **[19]** shows similar prevalence after schimer test was conducted with 5 x35mm strip of Whatman 41 filter paper where test result of ≤ 5mm indicate dry eye disease. while a US Study by Wu et al **[10]** on Prevalence of dry eye symptoms and relationship to screen time in a New York City using pediatric population found an average rate of 2.5.

Dry eye symptoms showed eye strain as the most common symptom, followed by headache as well as watering of the eyes, redness and dryness of the eye, similar results were found by Sultan et al (2017), with a vast majority (62.14%) presented with eye strain, burning sensation (7.57%), redness of eyes, dryness and irritation of eyes, neck stiffness, shoulder pain were (77.76%). Hafiz et al **[9],** on the study that showed that the most experienced symptoms were headache, eyestrain, neck pain, tiredness, or redness of eye.

According to the results, 0 out of the 19 participants who spend 1-3hours on their screen have dry eye, while for those who spend 4-6hours 6 out of 38 have dry eye, 12 out of 25 of the participants who spend 7-9hours have dry eye and 8 out of the 18 participants with above 9 screen time record have dry eye. Those who spent 7-9hours have dry eye and above 9 hours had dry eye more than those who spent 1-3hours and 4-6h0urs. This is similar with the study by Mufti *et al.,* **[8]** in which almost all the participants who spent 4 hours above had dry eye and this is almost in alignment with study conducted by Moldovan *et al.,* **[12]** to determine o study the correlation between PC screen exposure of over 8 hours and Dry Eye Syndrome in 18-25 years-old students, in which Among the 59 participants of this study, 26 were EXPOSED (> 8 hours of PC screen exposure = EXPOSED) and 33 were NONEXPOSED. The 18–25-year-old participants who were exposed over 8 hours to the PC screen had a relative risk of 5.5 to develop Dry Eye Syndrome.

Gender distribution of the effect of screen time on dry eye revealed that males had dry eye more than females for the screen duration of 4-6hours, an equal distribution for those within screen time group of 7-9hour and females had higher distribution than males for screen time of above 9. It also shows correlation between dry eye and screen time with respect to gender for higher screen time of above 9hours ($p=0.00$, $\rho<0.05$, which varies from that of Moldovan et al, **[12]** in which there was no correlation in respect to gender. Age group distribution of the effect of screen time on dry eye shows that those within the age group of 18-22 had the highest distribution of dry eye for the screen duration of 4-6hours, for those within 23-27years had higher frequency for screen time groups of 7-9hour and above 9 and those within 28-32 had equal distribution for both 7-9hours and above 9hours. Dry eye and screen viewing time in relation to age group show a correlation for 23-27years ($p=0.017$, $\rho<0.05$) with the Total Pearson Chi-Square of 0.000($p=0.00$, $\rho<0.05$), which could be as result of more screen use time within the age range this was not captured in most studies but can be said to be related to that of Titiyal *et al*., **[6],** whose study showed that the prevalence of dry eye disease was more in males (65.3%).

Pearson Correlations results showed a significance correlation between screen time and dry eye ($p=0.00$, $\rho<0.05$). This means that there is an effect of screen time on dry eyes in respect to higher hours of screen time. The risk increases if the time spent is greater than 4 hours. This is in accordance to the previous studies in which the results were statistically significant with p value 0.003 in a study by Mufti et al, **[8]** which shows that increased duration of usage of digital screens increases the risk of dry eye. Studies by Titiyal *et al*., **[6]** have found 4 or more hours of usage of video display terminals associated with 89.9% of dry eye cases.

Conclusion and Recommendations

In conclusion, the results of the study showed that according that Dry Eye Syndrome incidence and intensity of symptoms had increased proportionally with the hours of exposure. The duration of exposure plays an important role in the severity of these symptoms, suggesting a behavioural change in the exposed participants.

1. Wearing computer eyewear, looking away from the screen periodically, reducing the brightness of the device, increasing conscious blinking are some of the steps that help protect our eyes from the ill effects of technology.
2. Follow the 20-20-20 rule to avoid dry eyes: every 20 minutes take a 20 second break and look at something 20 feet away.
3. Educating the masses regarding the health hazards of the digital screens and need for regular eye checkups is recommended as a preventive measure towards dry eye and other hazards of the digital screens.

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