



Impact of Electronic Study on Vision Among Dijlah University College Students After Coronavirus Pandemic

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Abstract

Due to COVID-19 lockdown, our civilization has spent the last few months indoors, where education, employment, and enjoyment are all conducted using digital platforms. As a result, the frequency of digital eye strain increased. Dijlah University College students were the subjects of a cross-sectional study using a standardized and validated questionnaire during the COVID-19 period. The study comprised students who used a digital screen continuously and were in the age range of 18 to 30. Utilizing SPSS software, the statistical analysis was conducted. 101 people in all took part in the study. Participants primarily used their computers and smartphones for learning and enjoyment. The majority of users of digital screens were continual users, according to an analysis of usage patterns. For entertainment, about 26.73 percent of men (27) and 48.51 percent of women (49) used a digital screen constantly for more than two to four hours. The average participant used the screen for 2-4 hours, with 30.69 percent of men and 39.60 percent of women doing so for study purposes. However, the percentage of using a digital screen for more than eight hours a day was >4% for studying and 42% for pleasure. The majority of them utilized the screens for longer than two hours, both in daylight and without a white background.

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1. Introduction

Light-emitting diodes (LEDs) have been used to provide illumination in industrial and commercial environments [1]. LEDs are also used in TVs, computers, smart phones, and tablets. Although the light emitted by most LEDs appears white, LEDs have peak emission in the blue light range (400–490 nm) [2, 3]. The accumulating experimental evidence has indicated that exposure to blue light can affect many physiologic functions, and it can be used to treat circadian and sleep dysfunctions. However, blue light can also induce photoreceptor damage. Thus, it is important to consider the spectral output of LED-based light sources to minimize the danger that may be associated with blue light exposure [4–6]. UV is mostly blocked by the cornea or lens; therefore, only visible light can penetrate the eye and reach the retina. A recent study conducted with an animal model reported that blocking UV light and blue light with yellow-tinted intraocular lenses materials (400–450 nm) could protect the retina. Thus, reducing the amount of blue light reaching the retina in the range 400–450 nm may also be important for the protection of the retina. Epidemiological studies now point to an increase in myopia prevalence over the past half-century. Particularly, factors such as hereditary and more recently, eyestrain due to near work by using digital devices such as computers, smartphones and alike has increased

the risk of developing myopia and other binocular vision and accommodative problems. Large scale studies that have been performed in continents like Asia, Europe and Australia, point to all these factors that might have led to the myopia progression [7–9].

2. Experimental Procedure

In this study, students from Dijlah University College participated in a cross-sectional study. There were 101 students in the sample. The majority of the pupils are in the 18 to 30 age range. The study sample was chosen between January and March 2021 using a randomization procedure. Snellen charts and the Autorefractor are the tools employed. Then, a survey questionnaire was employed that included both open-ended and closed-ended questions, and the data gathering process was structured and validated [10]. The survey includes questions about the type of device used in the classroom, the typical amount of time spent using social media, the typical amount of time spent studying electronically on smart devices, whether a white screen background is used when using the device and messaging apps, whether blue light filtering is used when studying electronically, and an examination of people with vision issues.

3. Results and Discussion

The statistical analysis was done using SPSS version 20. The variables were expressed in both frequencies and percentage as following Table 1, 2, 3, 4 and figure 1, 2, 3, 4.

Table 1: The results details

Item	Male Mean±SD	Female Mean±SD	Overall Mean±SD
Age	21±1.75	20±1.95	21±1.95
Sex	41(40.59%)	60(59.41%)	101(100%)
Digital screens			
Smart phone	30(73%)	56(93%)	86(85%)
Personal computer	6(15%)	4(7%)	10(10%)
Tablet device	5(12%)	0	5(5%)
Hours spending			
Study	3±1.73	3±1.73	3±1.73
Social media	8±2.68	7±2.49	7±2.57
Wearing glasses or contact lens	Yes 17(42%) No 24(58%)	Yes 9(15%) No 51(85%)	26(26%) 75(74%)
Refractory errors			
Yes	16(39%)	8(13%)	24(24%)
No	25(61%)	52(87%)	77(76%)
Used white screen background			
Yes	13(32%)	21(35%)	34(34%)
No	28(68%)	39(65%)	67(66%)
White screen for messaging application			
Yes	18(44%)	21(35%)	39(39%)
No	23(56%)	39(65%)	62(61%)
Used blue filter when using classroom			
Yes	14(34%)	10(17%)	24(24%)
No	27(66%)	50(83%)	77(76%)

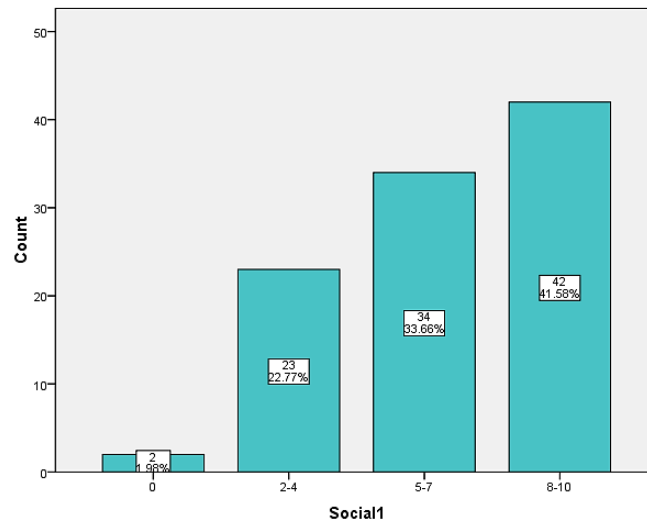


Figure 1: Relation between number of students and hours spending at social media

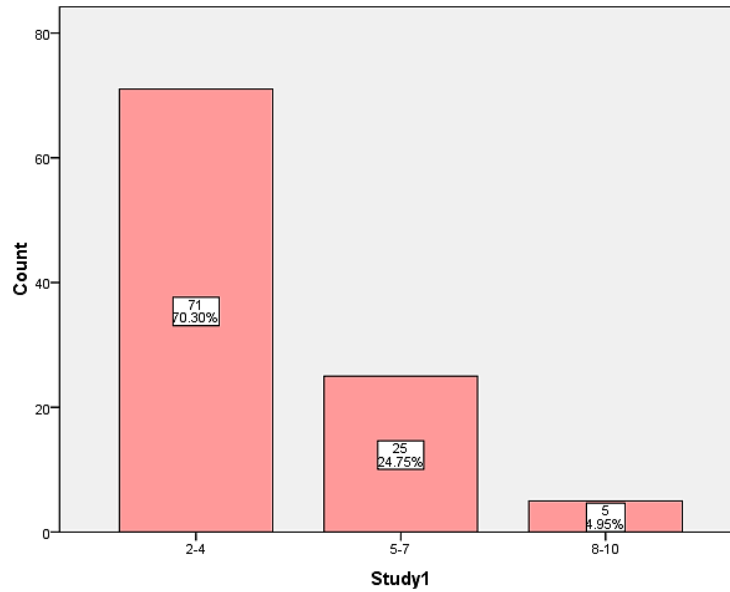


Figure 2: Relation between number of students and hours spending at electronic study

Table 2: Relation between hours spent for entertainment by male and female

Item	Social				Total
	0	2-4	5-7	8-10	
Female	2	9	21	28	60
Male	0	14	13	14	41
Total	2	23	34	42	101

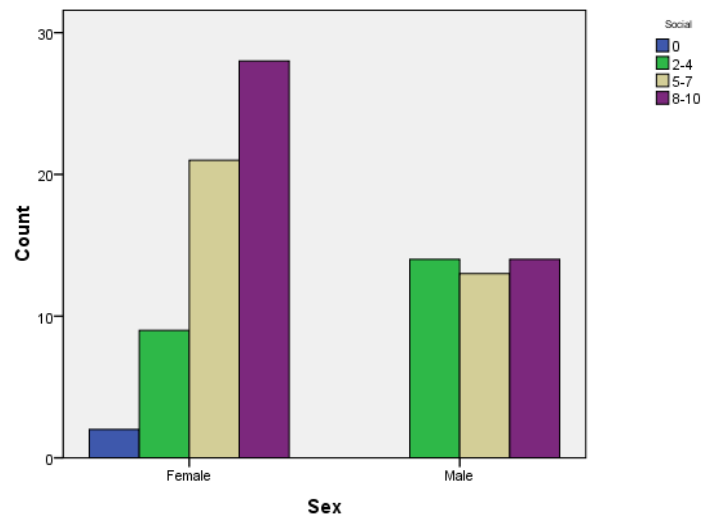


Figure 3: Relation between hours spent for entertainment by male and female

Table 3: Relation between hours spent for electronic study by male and female

Department	Hours							Total
	2	5	6	9	12	15	18	
Arabic Language	0	0	0	1	0	0	0	1
Banking Financial	0	0	0	1	2	0	0	3
Business Administration	0	0	3	1	4	0	0	8
Computer Sciences	0	0	0	1	2	0	0	3
Computer Techniques Engineering	0	0	0	1	1	1	0	3
Dental Technique	0	0	0	1	0	0	0	1
Civil Engineering	0	0	1	2	1	0	0	4
Dentist	1	0	1	1	0	2	0	4
Law	0	0	3	0	3	1	0	7
Optical Techniques	0	0	3	11	9	4	4	32
Heating, Ventilation, And Air Conditioning	0	0	3	1	0	0	0	4
Media	0	0	1	1	1	0	0	3
Medical Laboratory Technologies	0	1	4	4	17	2	0	28
Total	1	1	19	26	40	10	4	101

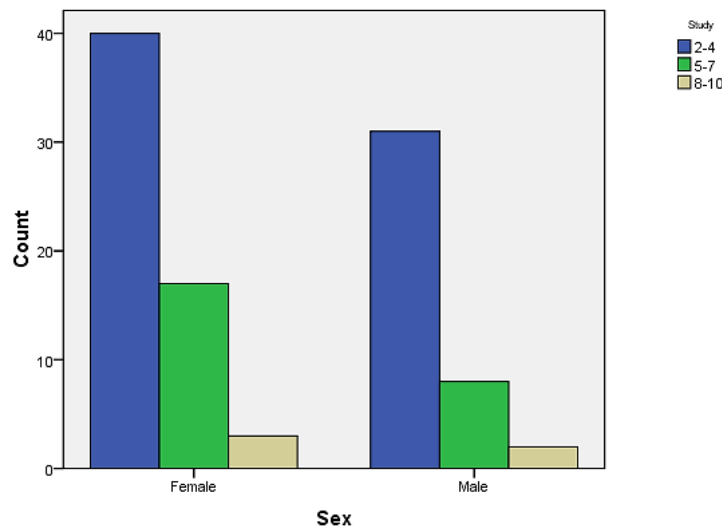


Figure 4: Relation between hours spent for electronic study by male and female

Table 4: Relation between hour spending using digital screen and refractory errors

Item	Hours							Total
	2	5	6	9	12	15	18	
No	1	1	13	21	29	8	4	77
Yes	0	0	6	5	11	2	0	24
Total	1	1	19	26	40	10	4	101

Out of 101 participants, 59.41% were females and 40.59% males. The mean age was found to be 21 ± 1.95 years. The major digital screen platforms used by them smartphone, laptop/computer and iPad/tablet. The utilization of digital screens was categorized under entertainment (98%) and (100%) academic purpose. A total of 26 % were using spectacles or contact lens wherein, 42% were male and 15% were females.

Assessment of timings of digital screen usage shown that majority of them was continuous users. About 26.73% of male (27) and 48.51% of females (49) were using the digital screen continuously for more than 2 to 4 hours for entertainment. The duration of usage revealed that most of the participants were using the screen for 2-4 hours of 30.69% male and 39.60% female for study. But the rate of usage of digital screen more than 8 hours per day was >4% for study and <42% for entertainment purpose. Majority of them used the screens not only in daylight but also without white background for more than 2 hours.

The blue light emerges from screens are beneficial during daytime to a limit because they boost attention, reaction times, and keep us awake, whereas at night they often impede sleep. Blue light is one of the shortest, yet highest energy wavelengths in the spectrum, therefore it flickers easier and longer than other types of weaker wavelengths. This flickering will produce a glare that reduces the visual contrast, affecting sharpness and clarity of vision.

4. Conclusions

Present scenario obliged the whole world to shift everything include studies, jobs, etc. into digital platform. The portable systems and other screens were increased in this duration. From the result it was found that smartphones were the most widely using one. This study was mainly focused on the usage of digital media in Dijlah University College after coronavirus pandemic and electronic study. Eyes will protect retina from UV lights and only minute level will enter but for blue light there is no protection or filter. Prolonged exposure to blue light may lead to macular cellular damage, which may lead to loss of vision. These study reported that to more than 76% were not concerned about using blue light filter.

Conflict of Interest

The authors declare that they have no conflict of interest.

References

1. Bruce, V., Green, P. R., & Georgeson, M. A. (2003). *Visual perception: Physiology, psychology, & ecology*. Psychology Press.
2. Land, M. F., & Fernald, R. D. (1992). The evolution of eyes. *Annual review of neuroscience*, 15(1), 1–29.
3. Taylor, H. R., West, S., Muñoz, B., Rosenthal, F. S., Bressler, S. B., & Bressler, N. M. (1992). The long-term effects of visible light on the eye. *Archives of ophthalmology*, 110(1), 99–104.
4. Lens, A., Nemeth, S. C., & Ledford, J. K. (2008). *Ocular anatomy and physiology*. Slack Incorporated.
5. Yonemoto, J., Noda, Y., Masuhara, N., & Ohno, S. (1996). Age of onset of posterior vitreous detachment. *Current opinion in ophthalmology*, 7(3), 73–76.
6. Ghazi, N. G., & Green, W. R. (2002). Pathology and pathogenesis of retinal detachment. *Eye*, 16(4), 411–421.
7. Darzins, P., Mitchell, P., & Heller, R. F. (1997). Sun exposure and age-related macular degeneration: An australian case—Control study. *Ophthalmology*, 104(5), 770–776.
8. Okuno, T., Saito, H., & Ojima, J. (2002). Evaluation of blue-light hazards from various light sources. *Developments in ophthalmology*, 35, 104–112.
9. Narimatsu, T., Ozawa, Y., Miyake, S., Kubota, S., Yuki, K., Nagai, N., & Tsubota, K. (2014). Biological effects of blocking blue and other visible light on the mouse retina. *Clinical & experimental ophthalmology*, 42(6), 555–563.
10. Kareem, H., Dauwed, M., Meri, A., Jarrar, M., Al-Bsheish, M., & Aldujaili, A. A. (2021). The role of accounting information system and knowledge management to enhancing organizational performance in iraqi smes. *Sustainability (Switzerland)*, 13(22). <https://doi.org/10.3390/su132212706>