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THE FREQUENCY OF GADGET USAGE OR MONITOR EXPOSURE AND EYESTRAIN

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Abstract

Monitor exposure from laptops or computers, cellphones and the frequency of their use, is still a suspected cause of eye disorders. The impact felt by students from monitor exposure is the appearance of eye fatigue, which results in impaired concentration and focus of learning. This study was conducted to examine the causes of eye fatigue caused by the duration, distance, time and lighting in the use of gadgets, monitor exposure. This type of the study is quantitative with an analytic observational design. The sample technique used consecutive sampling. The sample in this study was 118 Nursing students at Respati University, Yogyakarta The Bivariate test used independent T-test. The results of the study showed that the eye fatigue of students was 92.4%. The relationship test of time, distance, time, and lighting in the use of gadgets with eye fatigue obtained p value more than 0.05. The relationship between the use of eye glasses and eye fatigue was 0.008 (p value < 0.05. There are no significant different between length, distance, time and lighting in gadget use and monitor exposure and eye fatigue. There is a significant different between the used of eye glasses and eye fatigue.

Keywords: *Frequency; Distance; Light; Gadget Usage Time; Eyestrain*

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1. Introduction

The use of computers can cause various complaints such as headaches, muscle aches, shoulder aches and eye fatigue (Suma'mur, 2013). Prolonged use of computers increases visual demands which can result in eyestrain. In addition, too long reading a book with low light conditions and watching television for too long can also cause eyestrain (Gonza, Susi, Barrio, & Antona, 2018)

Eyestrain includes the disturbances of eyes that occur due to prolonged viewing of a computer screen, reading, watching television (Akbar & Hawadi, 2011), playing cellphones in a dark room (Arisha, 2018), objects that are seen on a cell phone are too small and not bright enough. Eyestrain is characterized by pain in the eyes, red eyes, double vision, headaches (Akbar & Hawadi, 2011), heartburn, heaviness in the forehead (Tjokrone & Utama, 2009), pain in the neck and shoulders (Sya ' Tires & Riski, 2014). The incidence of eyestrain according to World Health Organization is 35-48%. One of the factors causing eyestrain is ocular factor. Ocular factors include ocular abnormalities in the form of ametropia and heterophoria. Ametropia is a refraction disorder but is not corrected (Pakpahan, 2018). Refractive disorders can also cause severe low vision. In Indonesia, the prevalence of severe low vision in Yogyakarta is 0.3% (Indonesian Agency for Health Research and Development, Ministry of Health, 2013).

Research results at Klabat University show that 62.3% of students experience eyestrain after using a computer (Dunita, 2015). Research at the UIN Sunan Kalijaga shows 86% of students experience eyestrain during or after working at the computer (Ardiansyah, 2016). Research conducted at Syiah Kuala University in Banda Aceh as many as 77.7% of students experienced eyestain after using a laptop (Febrianti & Bahri, 2018). Among of those whose had eyestrain is equivalent to a student age, the visual system has undergone a functional maturation process so that the visual network is more sensitive to environmental changes than other populations (Ananda & Dinata, 2015).

Eyestrain must be considered, because it is a problem that is always found if there is no early treatment. We know that the eyes are very important in all aspects of life including education (Juneti, Bebasari, & Nukman, 2015). The impact that can arise from eyestrain is a person's unproductive activities, decreased quality of work, easy to make mistakes. (Akbar & Hawadi, 2011). Eyestrain can also cause vision to be blurry or called cataracts (Nugraha, 2018).

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Based on a preliminary study thet conducted on January 22, 2019 on 20 students, about eyestrain 100% results obtained complaints after using a laptop or reading a book for a long time. The signs and symptoms of eyestrain, the students felt pain or discomfort in the eyes (55%), double vision (25%), red eye (15%).

2. Methode

The type of the study was quantitative with an analytic observational research design. The sample technique used consecutive sampling. Data collection used questionnaires that have been tested for validity and reliability. The result is a valid and reliable instrument with a Cronbach alpha value of 0.893. Bivariate test was used h independent T-test. The sample in this study was 118 Nursing students at Respati University, Yogyakarta.

3. Results and Discussion

Characteristics of respondents

Table 1. Distribution of nursing students program of health faculty Academic Year 2016/2017 (n.118) in 2019.

Characteristic	n	Percentage
Male	27	22.9%
Female	91	77.1%
Total	118	100%

Based on table 1 it is known that the majority of female respondents were 77%, this is accordance with data from BAAK that the majority of sexes are in Nursing students in Academic Year of 2016/2017 more than 70% are women.

Table 2. Eyestrain nursing students Academic Year of 2016/2017 (n. 118) in 2019.

Eyes-rain	mean	Standard error mean	Min	Max
	21.46	0.96	0	54

Mean score of eyestrain of nursing students Academic Year of 2016/2017 is 21.46, with minimum score 0 and maximum score 54 and standard 0.96. There is only 1 students doesn't feel eyestrain.

Table 3. The duration of gadget used Nursing Students Health Faculty of UNRIYO Academic Year of 2016 / 2017 in 2019

The duration of gadget used	n	Procentage (%)
Long	100	84.7%
Short	18	15.3%
Total	118	100

The table 3 showed that majority the respondent used the gadget in long duration 84.7%.

Table 4. The relationship between the duration gadget used and eyestrain.

	The duration of gadget used	mean	Mean diffrent	P value
Eyestrain	Long	21.82	2.38	0.376
	Short	19.44		

The bivariate analysis showed there is no significant relationship between the duration of gadget used and eyestrain. The different mean between long and short duration of gadget used was 2.38.

The distance of gadget usage and relationship with eyestrain

Table 5. The distance of gadget usage on nursing students program of health faculcy of Respati University Academic Year 2016/2017 in 2019

The distance gadget usage	n	Percentage (%)
inappropriate	67	56.8%
Appropriate	51	43.2%
Total	118	100

According table 5 the distance on the gadget usage between eyes and the gadget or computer monitor majority are inappropriate 56.8%.

Table 6. The relationship between the distance of gadget usage and eyestrain

	The distance of gadget usage	Mean	Mean Different	P value
Eye-strain	Inappropiate	21.63	0.39	0.841
	Appropiate	21.24		

According to table 6 there is no significant different of distance of gadget usage and eyestrain p value 0,841. The mean different between inappropriate and appropriate distance 0.39.

Time of Gadgets usage and the relationship with eyestrain.

Table 7. Time of gadget usage nursing student's program health faculty of Respsti University Yogyakarta.

Time of gadget usage	n	Percentage (%)
Every time	55	46.4%
Free time	63	53.6%
Total	118	100

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According to the table above, that the time of gadget usage on the respondent 53.6% used gadget when free time.

Table 8. The relationship of time of gadget usage and eyestrain on the nursing students program the academic year of 2016b/2017 (n 118) in 2019.

	Time of gadget usage	mean	Mean Differen	P value
Eye-strain	Every time	21.91	0.85	0.663
	Free time	21.06		

The result of bivariate analysis of table 8 showed there is no significant different between time of gadget usage and eyestrain mean different 0, 85 and p value 0,663.

Lighting on the gadget usage and the relationship with eyestrain.

Table 9. The lighting on the gadget usage of nursing students program the academic year of 2016/2017 9n 118) in 2019.

Lighting on the gadget usage	n	Percentage (%)
Dark	43	36.4%
Light	75	63.6%
Total	118	100

According to the table above is described that the lighting on the gadget usage 63.6 % is light.

Table 10. The relationship between lighting on the gadget usage and eyestrain on the nursing students program of academic year 2016/2017 (n118) in 2019.

	Lighting of gadget usage	mean	Mean Different	P valu
Eyestrain	Dark	21.72	0.41	0.837
	Light	21,31		

The result of bivariate on the table 10 is described that there is no significant different on the lighting on the gadget usage and the eyestrain, the mean different is 0.41, and the p value 0,837.

The lenses usage / eye glasses and the relationship of eyestrain.

Tabel 11. The lenses usage / eyeglasses and eyestrain on the nursing students program academic year 2016 / 2017 (n 118) in 2019

Lenses usage/ eyeglasses	n	Percentage (%)
Eyeglasses	22	24.4%
No eyeglasses	68	75.6%
Total	90	100

According to the table 11 above shows that majority of the nursing studnets program of academic year2016/2017 use the eyeglasses 75.6%.

Table 12. The relationship between lenses usage / eyeglasses and eyestrain on the nursing students program academic year 2016/2017 9n118) in 2019.

	Lenses usage/ eyeglasses	mean	Mean different	P value
Eyestrain	Eyeglasses	25.09	6.94	0.008
	No eyeglasses	18.15		

The result of bivariate analysis above shows that there is significant different between lenses usage / eyeglasses and the eyestrain, with different mean 6.94 and p value 0,008.

The results showed that the frequency or duration of gadget usage, the distance of gadget usage with the eyes, the time the gadget was used and the light used when using a gadget were not significantly related to eye fatigue in nursing students with a P value greater than 0.05. The results of this study indicate that long time using a gadget does not affect eye fatigue. This result is likely due to factors such as how often someone blinks while using gadget. Blinking eyes function to maintain normal eyes, triggering a cycle of tear secretion and drainage. A person's duration without blinking for 20 seconds or a maximum time of 23.12 seconds is not enough to modulate eye fatigue (Pakpahan, 2018).

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In addition to eye blinking factors one of the factors that cause eyestrain is ocular. Ocular factors include ocular abnormalities in the form of ametropia and heterophoria. Ametropia is a refractive disorder but is not corrected. Refractive disorders can also cause severe low vision (Pakpahan, 2018). In accordance with the results of the study showed the figure of 24.4% of respondents who used glasses, the use of eye glasses in the respondents caused by low vision conditions. Test results note that the use of eyeglasses or eye lenses is significantly related to eye fatigue in Nursing Students (Fadhillah, 2013).

In this study, the distance between respondents' eyes with a gadget monitor was mostly

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in the inappropriate category (56.8%). However there was no significant relationship with eye fatigue (p> 0.05). The same results were also found that there was no relationship between visibility using gadgets with subjective complaints of eye health disorders. This result is likely to occur because there are other factors such as lack of lighting so that someone who works with a distance of <50 cm and ≥ 50 still experience fatigue in the eye. Many other factors that affect fatigue in the eye such as large monitors, but at least a distance of 50-70 cm must be reached between the eyes with the screen or monitor.

Other results from this study indicate that the light factor when using a gadget is not significant for eyestrain. Different results that there is a relationship between lighting when using a gadget with subjective complaints of eye health disorders. This different result is likely to occur because the majority of respondents in this study use more gadget in bright light conditions (63.6%). The imbalance of light between the gadget screen or computer and the surrounding environment is an important factor that must be considered. Students who use computers in very bright or dark rooms are more prone to symptoms of eye fatigue. Many students complained of headaches when the light was very bright and complaints of dry eyes using darker screens. Therefore, the brightness with the contrast of the screen must be adjusted to provide a balance with room lighting and maximum visibility.

The average difference in the value of eye fatigue between respondents who wear glasses and those who don't use glasses is 6.94. This average difference is much greater between the average value of eyestrain if it is related to the frequency of the use of gadgets that are long or short, the distance of the use of the gadgets that correspond to the ones that are not appropriate, the time of use of the gadgets at any time as well as the leisure and light when using bright gadgets or dark with an average value of 0.35 to 2.35.

Eyestrain based on research results is more caused by internal factors, namely ocular conditions compared to external factors such as length, distance, time and light when using gadgets. Eyestrain based on the results of this study as much as 92.4%, the figure is higher than the results of research by Dunita conducted at Klabat University shows that 62.3% of students experience eyestrain after using a computer (Dunita, 2015). Research at the UIN Sunan Kalijaga campus shows 86% of students experience eyestrain during or after working at the computer (Ardiansyah, 2016). Research conducted at Syiah Kuala University in Banda Aceh as many as 77.7% of students experienced eyestrain after using a laptop (Febrianti & Bahri, 2018).

4. Conclusion

Based on the results that have been obtained, it can be concluded that eyestrain in nursing students in TA.2016 / 2017 is not related to the frequency or duration of gadget usage, not related to light when using a gadget, not related to distance or light when using a gadget. Eye fatigue in this study only relates to the use of lenses or glasses.

5. Suggestion

Respondents are advised to take various treatments to reduce eyestrain. Need to make corrections to the eyes whether having low vision or not for those who do not use glasses or who wear glasses. To the community science educators. It is recommended to add an assessment of eye fatigue in the occupational health course

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