Intensity of Using Gadgets and Eye Fatigue Complains in Students

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Submitted:3/7/2021 **Conferrence:** 17/10/2021 **Accepted:** 12/12/2021 **Published online**: 7/3/2022

Abstract: The intensity of excessive use of gadgets can cause eye fatigue or complaints. Purpose of this study was to analyze the relationship between intensity, consists of duration and frequency with eye fatigue in students at STIK Immanuel Bandung. The research design used an analytical survey study with cross sectional design, and using proportional simple random sampling to determine sample size as many as 100 students. The results showed students with high frequency of using gadget was 87%, high duration on using gadget was 62%, and there were complaints of eye fatigue as many as 76%. Bivariate analysis showed that there were relationship between frequency and duration of using gadget and eye fatigue, p value<0.05). The results of the study showed that there was a significant association between frequency and eye fatigue, also duration and eye fatigue. The longer duration and frequency in use of gadget, the more eye fatigue on students. Suggestion based on this study is to form students health promotion team and provide education about gadgets by social media to all students in order to improve the awarness and prevent diseases that caused by excessive using gadgets.
Keywords: : Gadgets; Intensity; Duration; Eye fatigue; Student

Introduction

Human life that began from simplicity is now a life that can be categorized as very modern. Communication that used to take a long time, now with technology everything becomes fast and as if without distance. At the beginning of its appearance, gadgets are only owned by certain people who really need it for the sake of smooth work (Marpaung, 2018). The Indonesian Internet Service Providers Association (APJII) explained the results of a survey entitled "Penetration and Behavior of Indonesian Internet Users 2017" in collaboration with Teknopreneur stated that the penetration of internet users in Indonesia increased to 143.26 million people or equivalent to 54.7% of the total population in Indonesia . (Henri Kasyfi Soemartono, 2018)

The phenomenon of gadget use has occurred among students. On various occasions, students are busy playing gadgets, be it in public areas, in private vehicles, or on public transportation. The number of Indonesian gadget users is expected to grow to 103 million in 2018, which will make Indonesia the fourth largest country as a worldwide gadget market after China, India, and the United States. (Nugraha, 2017)

Based on data from the World Health Organization (WHO) shows the incidence of eye fatigue or astenopia in the world ranges from 75%-90%. Knowledge, Attitude, and Practices (KAP) survey of ophthalmologist in India reported astenopia as much as 97.8%. (Gumunggilung, Doda, & Mantjoro, 2021) Meanwhile, according to basic health research data (RISKESDAS) in 2013 about 4.6% of the total population of Indonesia wear refractive glasses and eye lenses, or in other words minus glasses.

Looking at the gadget screen for a long time can share additional pressure on the eyes and nerve layers. The use of gadgets with more than 2 hours can increase the risk of shrinking visual acuity 3 times greater than those who use gadgets less than 2 hours a day. The use of gadgets with a fairly long duration will make the eyes exposed to heavy radiation. Radiation can cause eye fatigue and other eye constraints and other visual problems. For example, the eyes become sore, blurred, exhausted and more vision will decrease to minus (nearsightedness). (Diningsih, 2018)

Eye fatigue is the result of the greatest use of gagdet. Eye fatigue can also be called astenopia, occurring when the eyes are too tired in prolonged and intense use. Deep concentration not long can cause eye fatigue (Ganie et al., 2019). The results of research "Factors Related to Eye Fatigue Complaints In Computer Operator Workers" showed that more than half of 67.5% of operators experienced eye fatigue complaints. Eye fatigue arises as intensive stress from eye functions such as to accommodation muscles in workers who need careful observation. Eye fatigue occurs because the eye muscles are forced to work hard, especially when they have to see close objects for long periods of time (Firdani, 2020).

After a preliminary study on 10 students, it was obtained that out of 10 students every day using gadgets to do various things, such as online lectures, playing games, listening to music, etc. In addition, 8 out of 10 students admitted that they often feel eye fatigue, symptoms they feel are dizziness accompanied by nausea, sore eyes, and double vision.

Methods

This research uses quantitative research methods with a cross sectional approach. The population in this study was STIK Immanuel students from 6 Study Programs totaling 553 students. The sample in this study amounted to 100 students using proportional random sampling techniques. The instrument used is a questionnaire. Data analysis is divided into 2, namely univariate analysis using frequency distribution tables and bivariate analysis using the Chi Square Test. The research was conducted at STIK Immanuel Bandung on July 6-8, 2021. Research is conducted through statistical analysis with computer aids through SPSS (Statistical Packages For Service Solution) software. Research has received recommendations from KEPK STIK Immanuel Bandung No. 040/KEPK/STIKI/VI/2021.

Result

Based on Table 1 that almost all of the respondents were women who numbered 93 students (93%), almost half of the respondents were from the Nursing Undergraduate Study Program amounting to 33 students (33%), and almost half of the respondents were in the class of 2019 amounting to 39 students (39%).

Table 1. Distribution of Respondent Characteristics

Characteristics	Frequency	Percentage (%)
1. Gender		
a. Male	7	7
b. Female	93	93
2. Study Program		
a. Bachelor of Nutrient	27	27
b. Bachelor of Nursing	33	33
c. Bachelor of Public Health	8	8

d. Diploma of Midwifery	10	10
e. Diploma of Nursing	6	6
f. Diploma in Hospital Manajemen	16	16

Table 2. Frequency Distribution of Gadget Use

Frequency of Gadget Use in a Week	**Amount**	**Percentage (%)**
High (every day)	87	87
Medium (5 day)	13	13
Total	100	100

Table 3. Distribution of Frequency of Gadget Use Duration

Duration of Gadget Use in a Day	**Amount**	**Percentage (%)**
High (>5 hour)	62	62
Medium (3-5 hour)	27	27
Low (1-2 hour)	11	11
Total	100	100

Table 4. Frequency Distribution of Eye Fatigue

Eye Fatigue	**Amount**	**Percentage (%)**
There are complaints of eye fatigue.	76	76
No complaints of eye fatigue	24	24
Total	100	100

Based on Table 2 that almost all of the respondents used high-frequency gadgets, which is 87 students (87%). Based on Table 3 that most respondents use gadgets with a high duration of 62 students (62%) with an average duration score of 1.51. Based on Table 4 that almost all of the respondents experienced complaints of eye fatigue with a total of 76 students (76%).

Table 5. Frequency Distribution of Symptoms of Eye Fatigue

Symptoms of Eye Fatigue	Category								**Total**	
	Never		Sometimes		Often		Very Often			
	f	%	f	%	f	%	f	%	f	%
Pain/throbbing around the eyes			2	100					2	100
Blurred vision			1	33.3	2	66.7			3	100
Double vision			5	62.5	3	37.5			8	100
Difficulty focusing	5	71.4	2	2.6					7	100
Sore eyes					10	5.8	7	41.2	17	100
Red eyes	5	55.6	4	44.4					9	100
Watery eyes	2	66.7	1	33.3					3	100
Headache					7	41.2	10	5.8	17	100
Dizziness and nausea			4	40	4	40	2	20	10	100
Total	12	15.8	19	25	26	34.2	19	25	76	100

Based on Table 5 that a small percentage of respondents experienced sore eye symptoms and headaches, where each symptom as many as 17 students. Symptoms of pain in the category are

often as many as 10 students (58.8%) and headache symptoms category often as many as 10 students (58.8%).

Table 6. Relationship of Gadget Use Frequency With Eye Fatigue

Frequency of Gadget Use	Eye Fatigue		Total		*p-value*
	There's a complaint	No complaints	f	%	
Medium	13 (100%)	0	13	100	0.034
High	63 (72.4%)	24 (27.6%)	87	100	
Total	76	24	100	100	

Table 7. Relationship of Gadget Use Duration With Eye Fatigue

Duration of Use of Gadget	Eye Fatigue		Total		*p-value*
	There's a complaint	No complaints	f	%	
Low	5 (4.,5%)	6 (54.5%)	11	100	0.041
Medium	21 (77.8%)	6 (22.2%)	27	100	
High	50 (80.6%)	12 (19.4%)	62	100	
Total	76	24	100	100	

Based on Table 6 shows that most students use gadgets with high frequency, which is as many as 87 students experience eye fatigue, which is as many as 63 students (72.4%). Berdasarkan hasil analisis uji Chi Square didapatkan hasil nilai p-value 0.034, dimana nilai p-value ≤ alpha (0.05), yang artinya bahwa H0 ditolak atau uji statistik menunjukkan adanya hubungan yang signifikan di antara frekuensi penggunaan gadget terhadap kelelahan mata pada mahasiswa. Based on Table 7 shows that almost all students use gadgets with high duration, which is as many as 62 students experience eye fatigue, which is as many as 50 students (80.6%). Based on the results of the Chi Square test analysis, the result of a p-value of 0.041, where the value of p-value ≤ alpha (0.05), which means that H0 was rejected or statistical tests showed a significant association between the duration of gadget use to eye fatigue in students.

Discussion

1. Intensity of Gadget Use

The intensity of gadget use is a form of quantity of gadget use based on the frequency (frequent) and duration (long rate) of use (Risna & Wahyuni, 2021). Just like the understanding already mentioned, in this study the intensity was divided into 2 consisting of frequency and duration. Frequency by (Erickson, 2011) It refers to the understanding of how often or often someone uses social media. Frequency is expressed within a certain period of time (e.g. per day, per week, or per month). Not so different from duration, frequency is also influenced by the motives of using the internet and the cost of internet use. Meanwhile, according to the Great Dictionary of Indonesian Language (KBBI) duration is the length of something when it lasts.

Based on the results of the study found that almost all respondents have the frequency of playing gagets in a week with a high category of 86 students (86%). Students at STIK Immanuel Bandung are generally in the category of high frequency of gadget use, this is due to the many daily activities of students who are not far from gadgets such as mobile phones, laptops, computers, iPads, etc. From the results of the study obtained also 65 students (65%)

use gadgets for online lecture activities. The learning process that changed from offline to online requires students to stay at home and do lecture activities in front of gadgets.

Online lectures conducted by students using the help of various applications, such as zoom, google meet, edmodo, and group chat on Whatsapp. This online lecture activity is usually carried out according to the schedule of each course with a duration that is generally for 3-4 hours and is done every day. In addition to being done for online lectures, gadgets for students are also used to do assignments and find lecture materials. That activity is what causes the frequency of playing gadgets in high students. Judging from the numbers, almost all of the respondents as many as 93 students (93%) are female. In research entitled "Relationship of Duration of Social Media Use With Incidence of Insomnia in Adolescents in State High School 9 Manado" stated that adolescent girls are more likely to enjoy interactions through social media because teenage girls have more desire to share or tell stories with others. This causes adolescent girls to be more dominant in using social media compared to teenage boys. Teenage girls tend to have a deep level of familiarity with those around them (W. K. Syamsoedin, Bidjuni, & Wowiling, 2015).

Based on the results of research conducted on students at STIK Immanuel Bandung, most of the respondents were in the category of high duration of playing gadgets in a day (>5 hours) as many as 62 students (62%). The reason for the duration they use in high gadget playing activities is in addition to online lectures, namely playing social media. As many as 20 college students (20%) spend their time surfing social media. According to (Tumiwa, 2021) In research from the University of Oxford on the ideal duration to do online activities in a day is 257 minutes or about 4 hours 17 minutes. If more than that, then gadgets are considered capable of disrupting brain performance.

2. Eye Fatigue

Based on the results of research conducted on students at STIK Immanuel Bandung obtained almost entirely from respondents experiencing complaints of eye fatigue as many as 76 students (76%). Eye fatigue is a strain on the eye and is caused by the use of the sense of sight at work that requires the ability to see for long periods of time which is usually accompanied by an uncomfortable state of vision. The distance between the monitor screen and the eyes that are too close can cause the eyes to become tense, tired quickly, and potentially experience vision complaints. This diversion of vision serves to relax the tension that occurs in the eye muscles (Gumunggilung et al., 2021), (Ningsih, 2016).

The results of the study obtained on students at STIK Immanuel Bandung almost entirely from female respondents as many as 93 students (93%), where according to (Kumasela, Saerang, & Rares, 2013) In his research entitled "Relationship of Laptop Use Time With Vision Complaints In Students of the Faculty of Medicine, Sam Ratulangi University" stated that vision complaints with the female sex are a risk factor for computer vision syndrom where the incidence rate of CVS is higher in women although not significantly related (Sumakul, Marunduh, & Doda, 2020). Some opinions that can support the results of this study include physiological differences between women and men that cause women to be more susceptible to disease and higher levels of female stress than men. Women tend to be more conscientious and pains taking in work so they will actually focus on the work at hand to reduce the rate of work errors.

3. Relationship of Gadget Use Intensity With Eye Fatigue

Based on the results of the study showed a significant association between the intensity of gadget use and eye fatigue, where the intensity is divided into 2, namely frequency and duration. With a value of p = 0.034 < 0.05 on the frequency of gadget use with eye fatigue and a value of p = 0.041 < 0.05 in the duration of playing gadgets with eye fatigue. The results of this study are in line with previous research entitled "Relationship of Device Use and Visus Disorders in State High School Students 1 Kawangkoan" stated that the use of gadgets with close visibility over a long period of time can cause subjective symptoms most often, namely astenopia (tired eyes). Visus disorder due to close viewing activity that is too often will cause the strength of eye accommodation will increase according to the needs, the closer the object the stronger the eye must accommodate (bulge) (Sumakul et al., 2020).

High eye fatigue in students at STIK Immanuel Bandung according to the theory according to (Nourmayanti, 2010) One of the effects is physical disorders such as headaches, double vision, and red eyes. Where the results of the study obtained by researchers, students who experienced headaches amounted to 17 people, double vision amounted to 8 people, and red eyes amounted to 9 people. This proves that there is a factor that causes the high number of eye fatigue in students at STIK Immanuel Bandung (Santoso, 2020). One of the factors is the intensity of lighting can affect physical, biological, and productivity comfort. The using of excessive gadgets also can affect sleep quality (Risna & Wahyuni, 2021). According to (Pranoto, 2015) some ways to overcome eye fatigue that can be done is the monitor screen screen becomes not too bright, adjust the lighting of the monitor screen according to room lighting, and if the eyes feel tired close the eyes for a few minutes, if it is on the verge of resting the eyes for a few minutes or for 1 hour so that the eyes are fresh and relaxed.

Conclusion

Almost all of the respondents played gadgets with high frequency in a week, and most of them play gadgets with a duration of > 5 hours every day. Respondents experienced complaints of eye fatigue, a small percentage of respondents experienced sore eye symptoms and headaches, with each of the symptoms. The symptoms of eye fatigue are sore eyes and headache. There was a significant relationship between the intensity (frequency and duration) of playing gadgets with eye fatigue and duration of using gadget among students at Sekolah Tinggi Ilmu Kesehatan Immanuel Bandung.

Form a group of students to carry out health promotion and provide education about using gadgets by social media to all students in order to improve the awarness and prevent diseases that caused by excessive using gadgets.

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