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The Relationship of Screen Time and Asthenopia Among Computer Science Students Universitas Klabat

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THE RELATIONSHIP OF SCREEN TIME AND ASTHENOPIA AMONG COMPUTER SCIENCE STUDENTS UNIVERSITAS KLABAT

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Abstract

Dalam melakukan pekerjaan *Tablet* komputer (komputer, *gadget, tablet, smartphone*) merupakan bantu untuk memfasilitasi pekerjaan sehari-hari, tetapi penggunaan *tablet* komputer yang tidak terkontrol dapat menyebabkan gangguan kesehatan khusus pada organ visual, dan salah satunya adalah Asthenopia (kelelahan mata) ditandai dengan beberapa gejala. Tujuan penelitian ini adalah untuk mengetahui hubungan lama penggunaan *tablet* komputer dengan kejadian Asthenopia pada mahasiswa Fakultas Ilmu Komputer Universitas Klabat. Penelitian ini adalah penelitian kuantitatif dengan desain penelitian deskriptif korelasi melalui pendekatan *cross sectional*. Teknik pengambilan sampel menggunakan *purposive sampling,* yang berjumlah 44 orang yaitu mahasiswa tingkat akhir. Instrumen yang digunakan berupa kuesioner kelelahan mata yang telah divalidasi expert. 51.1% (N=23) lama penggunaan tablet komputer > 4 jam dan 75.6 % (N=34), yang mengalami asthenopia. Hasil Uji *spearmen's correlation* didapatkan *p-value* = 0.054 (*>0.05*), menunjukan bahwa tidak ada hubungan yang signifikan antara lama penggunaan tablet komputer dengan kejadian asthenopia. Saran untuk peneliti selanjutnya gar dapat meneliti fakor resiko lainnya yang dapat mempengaruhi terjadinya asthenopia, dan bagi penggunaan *tablet* komputer selalu melakukan istirahat mata agar mengurangi asthennopia ke level yang signnifikant.

Keywords*:* Keywords: asthenopia, fakultas ilmu komputer, lama penggunaan *tablet* komputer, mahasiswa.

Abstract

At work, tablet computers (i.e computers, gadgets, tablets, smartphones) are technologies that are use as tools to help facillitate daily work. However, exessive uncontrollable usage of them may eventually resulting in health problem targetting the visual organs especially, which one of them was asthenopia as characterized by several symptoms. The purpose of this study was to determine the screen time and asthenopia among computer science students of Universitas Klabat. This is a quantitative study with descriptive correlation's cross sectional method. Purposive sampling method was used, participated by 44 senior students. The instrument used was asthenopia (eye fatigue) questionaire that had undergone expert validation, 51.1% (N=23) used computer tablets more than 4 hours and 75.6 % (N=34) experienced the sympotms of asthenopia, spearman correlation's test result shown a p-value of 0.054 (> 0.05), shthere is no significant relationship between screen time and asthenopia. Recommendations for future researchers or to be able to examine other factors that can influence the occurrence of asthenopia, and for tablet computers user need taking frequent breaks to help reduce these asthennopia to a significant level.

Keywords*:* Asthenopia, computer science, screen time, students

Introduction

In doing the work of using technology, it is very necessary to be able to help with everyday work. Along with the development of technology in the use of electronic devices in the form of computers, smartphones and other electronic devices commonly referred to as tablet computers (Thandung, Lintong, & Supit, 2013), became the main tool used in facilitating work, but the use of uncontrolled tablet computers in the long term can cause health problems more specifically in the eyes and one of them is asthenopia or often referred to as eye fatigue.

The results of the study in 2016 - 2017 reported that at the age of 3 years, 68% of children regularly use computers and 54% conduct online activities and in 2016 British adults spend 4 hours 45 minutes per day using digital media. Research conducted in the United States about two thirds of adults aged 30-49 years spend more than five hours on digital devices, and the latest data from the United States shows 37% of adults aged 60 years and over spend five hours or more a day using smartphone devices for exploring (Sheppard & Wolfson, 2018).

The use of technology that is not controlled can cause health problems in the visual organs resulting in eye fatigue (Asthenopia). Data from the world health organization or the World Health Organization (WHO), shows that vision and asthenopia events range from 40 to 90 percent (Supriati, 2012). According to Dorland's Illustrated Medical Dictionary 32nd edition (2009-2017), asthenopia is a condition where the visual organs experience fatigue and fatigue accompanied by pain in the eyes, headaches, blurry vision and others. Electromagnetic wave radiation and computer use time that ranges from more than three hours which causes asthenopia because (Montolalu, Doda, & Sekeon, 2018)

Through the results of a study conducted by the American Optometric Association (AOA) (2015), explaining that asthenopia can cause symptoms that are tired eyes, blurred vision and dry eyes, headaches, vomiting, nausea, sore eyes, runny eyes, red eyes , and shaded vision, one of which is the use of computers and other electronic devices for a long time (Kolowole, Iyanda, & Isawumi, 2017). According to Digital Eye Strain (2016) from the results of a survey conducted on one thousand adult Americans, who experience asthenopia and other eye disorders overall by sixty-five percent (Sheppard & Wolffsohn, 2018). The results of the Samsat Palembang office conducted by Kusuma, Sitorus, and Hasyim (2009) found that 73.3 percent of participants felt complaints about the eyes, and complaints that most felt respondent, namely sore eyes, headaches, and itchy eyes. Research also conducted by Kumarsela, Serang and Rares (2013), at the Faculty of Medicine at the University of Sam Ratulangi, North Sulawesi, among one hundred students of the 2011 class, showed that 73 percent of participants experienced asthenopia complaints.

The theory of Leininger's Transcultural Nursing proposed by Madeleine Leininger's stated that bad habits in activity if done continuously and uncontrolled can affect health (Siokal, 2015). Long use of computer tablets that are not controlled can cause illness due to work and injury to the eye that causes reduced vision / blindness due to tissue damage (anatomically) and impaired function (functional), so that it can interfere with daily activities (Astuti, 2012).

Through preliminary survey results conducted by researchers on ten students of the Faculty of Computer Science at the end of Universitas Klabat, it was found that after the use of a long computer which lasted two to six hours more experienced asthenopia with signs and symptoms such as eye pain, dry eyes, watery eyes, eyes swelling, heavy eyes, blurred and double vision, headaches, foreign body sensations, itchy eyes and reddish eyes. Based on previous theories and problems, researchers are interested in examining "The Old Relationship between the use of computer tablets and the incidence of Asthenopia in the students of the Faculty of Computer Science, Universitas Klabat"

Methods

The research method used is descriptive correlation method with cross sectional approach, and the variables in this study are divided into two namely dependent and independent variables. Dependent variable in this research is the use of tablet computer while the independent variable is Asthenopia. Data analysis in this study consisted of two parts, namely univariate analysis using the presentation formula and bivariate analysis using the Spearmen's Correlation Test. The researchers took samples by means of purposive sampling of 44 students of the Faculty of Computer Science Universitas Klabat in 2016 in accordance with the inclusion and exclusion criteria. The inclusion criteria in this study are

students who are enrolled and actively enrolled at Universitas Klabat, both men and women who were present at the time of data collection and exclusion criteria, namely participants who were at the fourth or final level, who did not use visual aids. such as glasses and contact lenses, and do not suffer from eye refractive abnormalities, and are willing to follow or fill out an informed consent form.

Long-term use	Percentage (%)
< 3 hours	28.9
3- 4 hours	20.0
>4 hours	51.1

The instrument used in this study was writing instruments such as pen and paper. The measuring instrument used is the Asthenopia Questionnaire (eyestrain) which was adapted from Arianti (2016), using the Guttman scale. The Guttman scale is a scale that has a choice of yes-no, right-wrong and others, and scoring for answers Yes = 1 and No = 0, (Masturoh & Nauri, 2018). This questionnaire was tested for expert validity by three experts namely ophthalmologists, influential lecturers of medicalsurgical courses and linguist lecturers. The asthenopia questionnaire contains 2 different question sections, namely the first question, namely the frequency of computer use in a day with a rest duration of about 3-5 minutes with indicators that are <3 hours, 3-4 hours and> 4 hours, for the second question which consists of 9 questions with a yes and no assessment of the symptoms of asthenopia, namely headache, nausea, vomiting, dry eyes, sore eyes, watery eyes, reddish eyes, shaded vision, blurred vision and to be able to interpret someone experiencing Asthenopia that is by means of, if there are two or more from the symptoms felt by the participants right during and after the use of a tablet computer then it can be said that the participants experienced an Asthenopia event (in Arianti, 2016).

The research location was the Faculty of Computer Science, Universitas Klabat, located in Airmadidi sub-district, North Minahasa Regency. Inform consent to be signed by the participant, because in ethical considerations the researcher must obtain permission from all parties. According to Masturoh and Nauri (2018), the confidentiality of participant information is guaranteed by the researcher and only certain data will be reported as research. The participant checklist sheet used in the study emphasizes ethical issues, namely Benefits, Autonomy, Fidelity, Justice, Non-maleficence, Confidentiality,Veracity.

Results

This section discusses the analysis of research data that has been processed using the SPSS application to provide information from the results of research that has been done.

Table 1. Duration of Tablet Computer Usage per day

In table 1 it can be seen that the duration of tablet computer use in the first computer science students of Universitas Klabat is 51.1% (23 people) who operate tablet computers > 4 hours per day, and the second is 28.9% (13 people), who operate computer tablets < 3 hours per day and the third is 20.0% (9 people) who operate tablet computers 3-4 hours per day.

Table 2. Asthenopia in computer science students Universitas Klabat.

Kejadian Asthenopia	n	Percentage (%)
Unasthenopia	11	24.4
Asthenopia	34	75.6

Table 2 it can be seen that the high incidence of asthenopia in students is 75.6% (34 people) and those without asthenopia are only around 24.4% (11 people).

No	Symptoms of Asthenopia	n	Percentage (%)
1	Headache	16	35.55
2	Nausea	2	4.44
3	Vomiting	1	2.22
4	Dry eye	24	53.33
5	Sore eye	33	73.33
6	Watery	25	55.56
7	Redness	19	42.22
8	Double vision	11	24.44
9	Blurred vision	14	31.11

Table 3. Symptoms of Asthenopia

Shows that there are nine symptoms of asthenopia, and the most frequent symptoms experienced by students are eye aches ranging from 73.33%, watery eyes around 55.56% and dry eyes 53.33%, while asthenopia symptoms experienced by participants at least vomiting around 2.22 % and nausea around 4.44%

Table 4. The Relationship between the long-term Use of Tablet Computers and the Occurrence of Asthenopia

Variabel	p-Value	Correlation Coefisein
Screeb Time	0.000	1.000
Asthenopia	0.054	0.290

Table 4 shows that the p value for the duration of tablet computer use with asthenopia is 0.054 and the correlation coefficient value is 0.290, this result is determined based on the level of significant $\alpha \leq 0.05$ using Statistical Package for the Social Science (SPSS) data processing. The results of this study are that there is no significant relationship between the old use of tablet computers with the incidence of asthenopia.

Discussions

The results of this study are in line with Mulyono (2018), regarding the average length of tablets the most frequent use of tablet computers is> 4 hours per day and the lowest is <3 hours per day, but it is different from research conducted by Supriati (2012), which is long longest tablet computer use> 6 hours / day and the lowest <4 hours / day.

The results of this study are in line with research conducted by Han, et al., (2013), namely the number more participants who experienced Asthenopia were 57 percent, similar to the results of research conducted by Nadia and Husnun (2018), namely participants who experienced Asthenopia more by 83.7 percent.

The data of this study are the same as the research conducted by Supriati (2012), found that the most common symptoms of Asthenopia are sore eyes, watery eyes, and dry or itchy eyes, but the results of different studies were carried out by Agarwal, Goel, and Sharma, 2013, the most common symptom is that the eyes feel burning and the eyes feel itchy.

The results of this study are in line with the research of Duniati (2016), that there is no significant relationship between the length of use of tablet computers with the incidence of asthenopia, but the results of different studies conducted by several researchers, the first by Arianti (2016), namely there is a significant relationship between the length of time computer use with Asthenopia events, the second by Montolalu, Doda and Sekeon, (2018), namely there is a relationship between the duration of computer use and the incidence of eye fatigue, and the third study, conducted in Brazil by Vilela, Pellanda, Cesa and Castagn, (2015), i.e. there is a significant relationship between computer use and asthenopia events.

The results obtained in this study are not in accordance with the existing theories or more studies that say there is a significant relationship about the length of use of tablet computers with the incidence of asthenopia than those who do not, this can be caused by the lack of samples that researchers obtain, and are not examined some risk factors that can cause asthenopia events such as visibility, light intensity, and work attitude.

Conclusion

The duration of use of tablet computers for students of the Faculty of Computer Science Universitas Klabat,> 4 hours per day the first was 51.1% (23 people), and the second was <3 hours per day by 28.9% (13 people), and the third was 3-4 hours per day by 20.0% (9 people). Students who experienced an Asthenopia event were 75.6 percent (34 people).

The results obtained are that there is no significant relationship between the use of tablet computers with the incidence of asthenopia in the students of the Faculty of Computer Science, University of Klabat.

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The results obtained are that there is no significant relationship screen time and asthenopia Computer Science students Universitas Klabat, but asthenopia is the most common visual complaints among computer science students for more than 4 hours per day, taking frequent breaks with 20-20-20 methods help reduced these asthenopia to a significant level.

Recommendation

Although the results of this study show that there is no significant relationship between the screen time and asthenopia, but the results of the study show that participants who increase asthenopia are more than those who do not asthenopia, seeking research for tablet computer users that can be used using the 20-20- 20, meaning that when working on tablet computer operating for 20 minutes, switch while looking away from the computer screen and view objects within 20 meters or about 6 meters for 20 seconds to be spent using asthenopia. And for further researchers to study other factors such as visibility, light intensity, and work attitudes that cause asthenopia.

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