



## COMPARATIVE ANALYSIS OF COMPUTER VISION SYNDROME (CVS) RISK FACTORS IN DIGITAL-BASED ELEMENTARY SCHOOL STUDENTS

Siti Alma\*, Meutia Zahara, Hermansyah

Master of Public Health, Postgraduate, Universitas Muhammadiyah Aceh, Jl. Muhammadiyah No.91, Batoh, Lueng Bata, Banda Aceh, Aceh 23123, Indonesia

\*sitialma1124@gmail.com

### ABSTRACT

The use of digital electronic devices is increasingly widespread among students, both in academic and non-academic contexts, but this can have negative impacts such as Computer Vision Syndrome (CVS). This study aims to analyze the comparative risk factors for CVS in digital-based elementary school students in Banda Aceh City and conventional-based students in Aceh Besar Regency. The study used a cross-sectional design with a total of 64 respondents using Simple Random Sampling technique, consisting of 32 students from each school. Data were collected between 15–30 August. The analysis was carried out using the Mann-Whitney U test, Independent Sample t-test, and logistic regression. The results showed a higher prevalence of CVS in digital-based students (75%) than in conventional. The average time of using electronic devices in the digital group was 8 hours/day, higher than the conventional group (5 hours/day). There was a significant difference in the duration of electronic device use between the two groups ( $p=0.0001$ ). The most dominant factor associated with CVS was the duration of digital electronic device use in a day (OR=2.05; 95% CI=1.41–2.99;  $p=0.0001$ ). This study emphasizes the importance of regulating the time of digital device use in children.

Keywords: computer vision syndrome risk factors; conventional; digital; students

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## INTRODUCTION

For more than 2 decades, information technology has experienced rapid progress, one of which is the discovery of computers and other digital electronic devices (Loh & Redd, 2008). The use of computers and other digital electronic devices such as laptops, e-tablets and mobile phones is now an inseparable part of the academic and non-academic world as a learning medium and even entertainment used by all ages ranging from children aged 3-6 years to the elderly aged 60 years and over (Novitasari & Khotimah, 2016). In accordance with the national education program in realizing school digitalization, Akhlaq Quran Islamic Elementary School is an elementary school that has a technology-based teaching and learning program package that utilizes laptops/computers (CHROMEBOOK) and collaborates with the Google Workspace for Education Network. Each student has a laptop as a medium for education and teaching at school or at home, making it easier for students to access and obtain knowledge through computers/laptops (SDIslamAkhlaqQuran, 2023). However, the use of computers and other digital electronic devices such as laptops, e-tablets and mobile phones also has negative impacts on health such as Computer Vision Syndrome (CVS) or often referred to as Digital Eye Strain.

Globally, it is estimated that nearly 60 million people suffer from CVS and the number of cases is expected to continue to increase every year (Ranasinghe et al., 2016). Some data show that 10% of the 66 million school children in Indonesia suffer from refractive disorders. If this condition is not treated quickly, it will result in the emergence of a layer of young Indonesians who have a low quality of life and intellectual in the future. In Indonesia, based on the results of the Rapid Assessment of Avoidable Blindness (RAAB) survey in 2014 to

2016 in 15 provinces, so far there has been no authentic evidence of eye damage caused by frequent computer use. However, it is stated that there has been research from several universities that states that excessive use of computers and gadgets can damage the eye condition of 40-60%, this eye disorder is usually experienced by elementary school students who have used gadgets and computers for 3-4 hours every day (Indah et al., 2022). This study aims to analyze the comparison of CVS risk factors in digital-based elementary school students in Banda Aceh City and conventional-based students.

**METHOD**

This research is descriptive analytical with cross sectional design aims to determine the relationship between independent and dependent variables studied at the same time when the research is conducted. Which aims to determine and analyze the comparison of risk factors for computer vision syndrome (CVS) in elementary school students based on digital in Banda Aceh City with conventional-based in Aceh Besar Regency. The population in this study were all students (40 students) of the Akhlaqul Quran Islamic Elementary School in Banda Aceh City and students of the Nurul Quran Character Islamic Elementary School (602 students) in Aceh Besar Regency who met the inclusion criteria. The sampling technique in this study was Total Sampling which met the inclusion criteria, namely students of the Akhlaqul Quran Islamic Elementary School in Banda Aceh City who used Laptops/computers (Chromebooks) and gadgets, namely 32 students consisting of students in grades 3, 4 and 5 and the number of students of the Nurul Quran Character Islamic Elementary School in Aceh Besar Regency who were used as respondents was adjusted to the number of students of the Akhlaqul Quran Islamic Elementary School, namely 32 students with the Simple Random Sampling technique using the lottery method on students in grades 3, 4 and 5 who were present during the study so that the total sample used was 64 students. Data was collected using the lottery method on students in grades 3, 4 and 5 who were present during the study, so the total sample used was 64 students. Bivariate analysis was conducted using the Mann-Whitney U test and Independent Sample t-test, and multivariate analysis was conducted using the logistic regression test.

**RESULT**

Table 1.  
Frequency distribution of computer vision syndrome risk factors in digital and conventional-based students

Variables	Group					
	Mean±SD	Conventional		Digital		
		f	%	Mean±SD	f	%
Age						
9 Years		13	40,63		13	40,63
10 Years		9	28,13		9	28,13
11 Years		10	31,25		10	31,25
Gender						
Male		11	34,38		15	46,88
Female		21	65,63		17	53,13
Use of Glasses						
No						
Yes		30	93,75		30	93,75
		2	6,25		2	6,25
CVS						
Not Experiencing CVS						
Experiencing CVS	7,63±3,52	11	34,38	9,21±4,81	8	25,00
		21	65,63		24	75,00
Length of Working with digital electronic	4,00±2,23			4,41±1,54		

Variables	Group					
	Conventional			Digital		
	Mean±SD	f	%	Mean±SD	f	%
Working hours in front of digital electronic devices in 1 day	4,66±2,43			7,56±3,08		
Length of Rest After Using Digital Electronic Devices	18,19±28,70			11,91±11,07		
Visibility When Using Digital Electronic Devices	36,09±18,26			36,88±17,31		
Position of the top of the monitor in relation to horizontal eye height	0,69±0,47			0,66±0,48		
Monitor Polarity	0,63±0,49			0,72±0,46		

Table 1 shows that the characteristics of respondents in the digital and conventional groups are relatively similar in terms of age and use of glasses. Most students are 9 years old (40.63%) and the majority do not use glasses (93.75%). There are differences in gender distribution, where male students are more dominant in the digital group (46.88%), while female students are more dominant in the conventional group (65.63%). The prevalence of Computer Vision Syndrome (CVS) is higher in digital-based students (75.00%) compared to the conventional group. In terms of experience using electronic devices, students in the digital group have an average length of use of 4.41 years, higher than the conventional group (4.00 years). In terms of daily duration, students in the digital group used electronic devices longer, with an average of 8 hours/day (SD 3.08), while the conventional group averaged 5 hours/day (SD 2.43). Break time after using electronic devices was higher in the conventional group (18 minutes) than in the digital group (12 minutes). The viewing distance while using the device was relatively similar, but the digital group had an average distance slightly further (36.88 cm) than the conventional group (36.09 cm). The position of the top of the monitor in relation to eye level was higher in the conventional group, while the use of positive polarity on the monitor (dark background, light characters) was more common in the digital group.

Table 2.

Frequency distribution of risk factors with the incidence of computer vision syndrome

Variables	Computer Vision Syndrome					
	Not Experiencings			Experience		
	Mean±SD	f	%	Mean±SD	f	%
Age						
9 Years		8	42,11		18	40,00
10 Years		3	15,79		15	33,33
11 Years		8	42,11		12	26,67
Gender						
Male		8	42,11		18	40,00
Female		11	57,89		27	60,00
Use of Glasses						
No		17	89,47		43	95,56
Yes		2	10,53		2	4,44
Length of Working with digital electronic devices	1,79±1,40			5,22±0,93		
Working hours in front of digital electronic devices in 1 day	2,58±1,80			7,60±2,22		
Length of Rest After Using Digital Electronic Devices	33,42±33,83			7,29±2,37		
Visibility When Using Digital Electronic	58,95±7,37			27,00±10,68		

Variables	Computer Vision Syndrome					
	Not Experiencings			Experience		
	Mean±SD	f	%	Mean±SD	f	%
Devices						
Position of the top of the monitor in relation to horizontal eye height	0,16±0,37			0,89±0,32		
Monitor Polarity	0,21±0,42			0,87±0,34		

Table 2 shows that students aged 9 and 11 years were more likely to be found in the group without Computer Vision Syndrome (CVS), at 42.11% each. In contrast, the lowest proportion was found at the age of 11 years in the group with CVS (26.67%). Female gender dominated the group with CVS (60%), while males were at 40%. The use of glasses was not a significant differentiating factor, because most students in both groups did not use glasses, with the highest percentage in the group with CVS (95.56%). The average duration of electronic device use was higher in the CVS group, at 5 years (SD 0.93), compared to the non-CVS group (2 years, SD 1.40). Similarly, the duration of daily electronic device use was significantly higher in the CVS group (8 hours/day, SD 2.22) compared to the non-CVS group (3 hours/day, SD 1.80). Students without CVS had longer breaks (33 minutes, SD 33.83) than the CVS group (7 minutes, SD 2.37). Viewing distance was also more ideal in the non-CVS group (59 cm, SD 7.37) compared to the CVS group (27 cm, SD 10.68). Monitor positions higher than the line of sight were more common in the CVS group, as was the use of positive polarity on the device screen, which was more common in students with CVS (0.87; SD 0.34).

Table 3.  
Bivariate analysis of risk factors in digital and conventional-based students

Variables	Group		p-Value
	Conventional (Mean ± SD)	Digital (Mean ± SD)	
Length of Working with digital electronic devices	4,00±2,23	4,41±1,54	0,703
Working hours in front of digital electronic devices in 1 day	4,66±2,43	7,56±3,08	0,0001
Length of Rest After Using Digital Electronic Devices	18,19±28,70	11,91±11,07	0,876
Visibility When Using Digital Electronic Devices	36,09±18,26	36,88±17,31	0,786
Position of the top of the monitor in relation to horizontal eye height	0,69±0,47	0,66±0,48	0,794
Monitor Polarity	0,63±0,49	0,72±0,46	0,433

Table 3 shows that digital-based students have a higher average duration of working with computers and electronic devices than conventional-based students. However, based on statistical tests, the difference is not significant (p=0.703). In contrast, in the variable of duration of working in front of electronic devices per day, a significant difference was found between the two groups (p=0.0001), with digital-based students showing a longer duration. This indicates that the daily frequency of electronic device use is more influential in differentiating usage patterns between the two groups compared to total years of experience. In other variables such as the length of rest after using electronic devices, viewing distance, monitor position, and screen polarity, although there were differences in the average between groups, no statistically significant differences were found (p>0.05). Conventional-based students had longer rest times, higher monitor positions, and slightly lower viewing distances than the digital group. Meanwhile, digital-based students used more positive polarity on the monitor. These findings indicate that although in practice there are variations in ergonomic behavior between digital and conventional students, statistically most of these variables are not significantly different.

Table 4.  
Bivariate analysis of risk factors for CVS events

Variables	Computer Vision Syndrome		p-value
	No CVS (Mean ± SD)	Experiencing CVS (Mean ± SD)	
Length of Working with digital electronic devices	1,79±1,40	5,22±0,93	0,0001
Working hours in front of digital electronic devices in 1 day	2,58±1,80	7,60±2,22	0,0001
Length of Rest After Using Digital Electronic Devices	33,42±33,83	7,29±2,37	0,0001
Visibility When Using Digital Electronic Devices	58,95±7,37	27,00±10,68	0,0001
Position of the top of the monitor in relation to horizontal eye height	0,16±0,37	0,89±0,32	0,0001
Monitor Polarity	0,21±0,42	0,87±0,34	0,0001

Table 4 shows that there are significant differences between students with Computer Vision Syndrome (CVS) and those without, in several ergonomic variables and habits of using electronic devices. Students with CVS have a higher average duration of computer and electronic device use, both in years and daily duration, with a p-value of 0.0001 for both variables. This indicates that longer exposure to electronic devices is associated with the occurrence of CVS in students. In addition, students without CVS showed longer breaks after device use, longer viewing distances, and more ergonomic monitor positions than students with CVS, with all variables showing significant differences (p=0.0001). The top of the monitor tended to be higher than the eye line in the CVS group, and the use of positive polarity (dark background, light text) was also more dominant in this group. These findings suggest that habits and ergonomic positions when using electronic devices contribute to the risk of CVS in elementary school students.

Table 5.  
Analysis of CVS incidence in digital and conventional groups

Variables	Group				p-value	OR (CI 95%)
	Conventional		Digital			
	f	%	f	%		
Experiencing CVS	21	65,63	24	75,00	0,413	1,57 (0,53-4,64)
Not experiencing	11	34,38	8	25,00		

Table 5 shows that students who experience CVS are higher in the digital group, which is 75.00% compared to conventional. While for students who do not experience CVS, it is higher in the conventional-based group, which is 34.38% compared to the digital group. From the results of this analysis, a p-value of 0.413 was obtained, which means that there is no relationship between CVS in students in the digital and conventional groups.

Table 6.  
Multivariate relationship between risk factors and CVS incidence in elementary school students

Variables	OR	p-value	CI 95%
Length of Working with digital electronic devices	0,97	0,913	0,57-1,65
Working hours in front of digital electronic devices in 1 day	2,05	0,0001	1,41-2,99
Length of Rest After Using Digital Electronic Devices	1,01	0,563	0,98-1,04
Visibility When Using Digital Electronic Devices	1,07	0,041	1,01-1,14
Position of the top of the monitor in relation to horizontal eye height	0,74	0,758	0,11-5,15
Monitor Polarity	0,87	0,871	0,15-4,92
Pseudo R2		0.3028	

Table 5 shows that the duration of working in front of digital electronic devices is most dominantly related to the occurrence of CVS in students with a p-value of 0.0001. The OR value of 2.05 indicates that if the duration of working in front of digital electronic devices increases, the change in CVS in students increases by 2.05 times when other variables are constant. The results of the statistical test show that the pseudo R<sup>2</sup> value is 0.3028, meaning that this factor is simultaneously (together) related to CVS in students by 30.28%.

## **DISCUSSION**

### **Comparison of the Duration of Working with Electronic Devices in Digital and Conventional Elementary School Students with the Incidence of Computer Vision Syndrome**

The results of this study indicate that the average length of time students work with electronic devices is higher in the digital group, namely 4.41 years with Elementary School 1.54 compared to the conventional group, namely 4.00 years with Elementary School 2.23. The statistical results obtained a p-value of 0.703. This means that there is no difference in the length of time working with computers and other electronic devices between digital and conventional students. Based on research by Septiyanti et al. (2022) there is a significant relationship between the length of computer use and the incidence of CVS in computer users. In this study, more respondents used computers for less than 5 years, as many as 47 people (69.1%). While respondents who used computers for more than 5 years were 21 people (30.9%). The results of the study obtained OR = 0.287 indicating that the length of time working with computers is a protective factor against the incidence of CVS, meaning that the length of time using computers for less than 5 years can reduce the risk of CVS (Septiyanti et al., 2022). The same results were obtained by showing the results of the duration of computer use with the incidence of CVS (P-value = 0.002), so there is a relationship between the duration of computer use and the incidence of CVS (Nopriadi et al, 2019).

Different from the research of Azkadina et al. (2012), the results of bivariate analysis on the relationship between the length of working with computers and the incidence of CVS obtained a p value = 0.436 with an odds ratio of 1.500 (95% CI = 0.539-4.171). This shows that the length of working with computers is not significantly related to the incidence of CVS. However, the length of computer use > 5 years can be at risk of CVS. Based on the explanation above, researchers assume that the longer a person uses a computer, the greater the likelihood of experiencing CVS symptoms. This can be caused by the eyes constantly focusing on the screen for years, causing eye fatigue. This can also be exacerbated by computer screens that can emit radiation, plus poor screen quality and resolution.

### **Comparison of the Length of time working in front of electronic devices in digital and conventional elementary school students with the incidence of Computer Vision Syndrome**

The results of this study indicate that the variable of working in front of computers and other electronic devices is higher in students who experience CVS compared to those who do not experience CVS. The statistical results obtained a p-value of 0.0001. This means that there is a difference in the length of working in front of computers and other electronic devices between students who experience CVS and those who do not. In the multivariate analysis, the length of working in front of digital electronic devices is most dominantly related to the occurrence of CVS in students with a p-value of 0.0001. This study is in accordance with research from Baqir (2017) which showed that there was a significant relationship between the duration of continuous computer use and the occurrence of Computer Vision Syndrome. With a significance value of 0.002 (p <0.05) so that H<sub>0</sub> was rejected. Odds Ratio (OR) = 16.429 (95% CI: 1.894-142.501) meaning that the risk of CVS in the duration of continuous computer use > 4 hours is 16.4 times greater than <4 hours. This can be caused by visual work

on computers that requires rapid eye movement (eye motility), accommodation (continuous focus), and vergence (alignment), all of which involve continuous muscle activity. This process results in repeated stress on the eye muscles, especially after using the computer for a long time, the blinking frequency decreases, the eyes become tired, and sore as a result of CVS complaints (Sutangi et al., 2023).

From the explanation above, researchers assume that the CVS effect can occur in both groups of students, but the intensity and characteristics of the symptoms can be different. Digital-based students tend to spend more time in front of the screen, especially if learning is done online. While conventional students have less screen time in the context of learning. Another difference is that the digital device screens used by digital learning students produce high blue light, which can increase the risk of eye fatigue and sleep disorders if used at night, while in conventional students, exposure to blue light from books or paper is usually lower. To prevent this, researchers suggest that efforts such as regular breaks, good lighting, and correct posture can help reduce the risk of CVS in both groups.

### **Comparison of Rest Time after using Electronic Devices in Digital and Conventional Elementary School Students with the Incidence of Computer Vision Syndrome**

The results of this study indicate that the length of rest after using computers and other electronic devices is higher in students who do not experience CVS compared to those who experience CVS. The statistical results obtained a p-value of 0.0001. This means that there is a difference in the length of rest after using computers and other electronic devices between students who experience CVS and those who do not. Based on research by Azkadina et al. (2012) the relationship between the length of rest after using a computer and the incidence of computer vision syndrome, the results showed that there was a relationship between the length of rest after using a computer and the incidence of computer vision syndrome ( $p = 0.004$ ;  $OR = 20.294$ ;  $95\% CI = 2.61157.748$ ). Sahitra (2016) found that the length of rest had an effect on computer vision syndrome, namely the presence or absence of rest ( $p < 0.0001$ ), the length of rest time ( $p < 0.0001$ ).

Research by Azkadina et al. (2012) showed that the length of breaks is significantly related to the occurrence of CVS. Computer workers who take breaks for less than 10 minutes are at thirteen and a half times higher risk of CVS compared to computer workers who take breaks for more than or equal to 10 minutes. Based on several research results above, researchers assume that there is no specific information about the difference in the length of rest after using a computer with digital and conventional-based students with the occurrence of Computer Vision Syndrome (CVS). However, several studies have investigated the relationship between the length of computer use and the occurrence of CVS. Although these results do not directly explain the difference in the length of rest after using a computer with digital and conventional-based students with the occurrence of CVS, these results indicate that the length of computer use can affect the risk of CVS.

### **Comparison of the position of the Top of the Monitor to the Horizontal Height of the Eyes in Digital and Conventional Elementary School Students with the Incidence of Computer Vision Syndrome**

The results of this study indicate that the average position of the top of the monitor was higher in the group experiencing CVS, which was 0.89 with Elementary School 0.32 compared to the group not experiencing CVS, which means that the average student experiencing CVS used the top of the monitor position higher than the horizontal eye height. The results of this study are in accordance with research conducted by Reddy et al. (2013) found a relationship between the position of the top of the computer monitor to the eyes and the incidence of CVS in students at the University of Malaysia with a value of  $p = 0.001$ . Symptoms of headache,

eye strain, dry eyes, burning sensation, gritty sensation, watery eyes, stiff shoulders, back pain, and fatigue were reported to increase with the length of daily computer use. Spending long periods of time with a computer screen without taking a break can cause problems with changes in focus on the screen, documents and keyboard. A good monitor position is one where the horizontal height is parallel to the eyes. A monitor position that is higher than the eye position will cause the eye's viewing angle to be larger and reduce the blinking frequency. This can cause the eyes to become dry (Nadia et al., 2021). Researchers assume that the position of the top of the monitor is higher or lower than the horizontal height of the eye causing the wide opening of the eyelids so that the eyes become dry, and also there is an adjustment of the head to the monitor (awkward posture: bending/looking up) causing GOTRAK (work-related musculoskeletal disorders). The top position of the monitor can be adjusted up and down and placed parallel to the position of the eyes.

### **Comparison of Monitor Polarity in Elementary School Students Based on Digital and Conventional with the Occurrence of Computer Vision Syndrome**

The results of this study indicate that on average, students who use monitor polarity are higher in the group experiencing CVS, which is 0.87 with an SD of 0.34 compared to the group not experiencing CVS, which means that on average, students experiencing CVS use positive polarity (dark background color, lighter character color) on their electronic device screens. Based on research conducted by Priliandita (2015) it shows that the polarity of the Visual Terminal Display (VTD) or monitor is not related to the occurrence of CVS with a p-value of 0.488. However, this study is different from the study conducted by Yudia et al. (2023) which shows that positive polarity (white writing on a black background) is preferred (59.9%) by users of electronic devices and from the results of this study it was found that the use of positive monitor polarity can increase the occurrence of CVS. Researchers assume that students who work on monitors and written documents alternately need to adjust between the monitor screen with a dark background and written documents that are mostly white. The adjustment made by the eyes will gradually reduce visual function. Another reason positive polarity can worsen CVS symptoms is because dark backgrounds tend to be reflective, where bright light will produce hot spots or shadows on the monitor screen, in addition, bright light will blur the monitor screen so that it will reduce the level of contrast between the screen background and the characters.

### **Relationship Between Working Long in Front of a Computer and CVS Incidents**

Based on the results of this study, it was found that the most dominant factor in the occurrence of CVS was the variable of working in front of digital electronic devices with a p-value of 0.0001. The OR value of 2.05 indicates that if the length of working in front of digital electronic devices increases, the change in CVS in students increases by 2.05 times when other variables are constant. The results of the statistical test showed that the pseudo R<sup>2</sup> value was 0.3028, meaning that this factor simultaneously (together) was related to CVS in students by 30.28%. This study is in accordance with research from Baqir (2017) which showed that there was a significant relationship between the duration of continuous computer use and the occurrence of Computer Vision Syndrome. With a significance value of 0.002 ( $p < 0.05$ ) so that H<sub>0</sub> was rejected. Odds Ratio (OR) = 16.429 (95% CI: 1.894-142.501) meaning that the risk of CVS in the duration of continuous computer use > 4 hours is 16.4 times greater than < 4 hours. This can be caused by visual work on computers that requires rapid eye movement (eye motility), accommodation (continuous focus), and vergence (alignment), all of which involve continuous muscle activity. This process results in repeated stress on the eye muscles, especially after using the computer for a long time, the blinking frequency decreases, the eyes become tired, and sore as a result of CVS complaints (Sutangi et al., 2023). Based on the explanation above, researchers suggest that teachers and parents can control children in the use of electronic devices used by students. Time restrictions are given for children in

using laptops, gadgets or tablets at home or at school so that their time in using electronic devices can be limited.

## **CONCLUSION**

The results showed that students who experienced Computer Vision Syndrome were higher in digital-based students, namely 24 students (75.00%) compared to conventional-based students. The average length of time students used electronic devices was higher in the digital group, namely 8 hours/day with SD of 3.08 hours/day compared to the conventional group, namely 5 hours/day with SD of 2.43 hours/day. The results of the bivariate analysis showed that there was a difference in the length of time working in front of digital electronic devices between digital and conventional-based students ( $p = 0.0001$ ). The results of the multivariate analysis showed that the most dominant variable related to the occurrence of CVS was the length of time using digital electronic devices in a day (OR = 2.05; 95% CI = 1.41-2.99;  $p = 0.0001$ ).

## **REFERENCES**

- Azkadina, A., Julianti, H. P., & Pramono, D. (2012). The relationship between individual and computer risk factors for the occurrence of Computer Vision Syndrome [Fakultas Kedokteran].
- Baqir, M. (2017). Relationship Between Length of Computer Use and the Incidence of Computer Vision Syndrome in Computer User Employees at Muhammadiyah University of Palembang [Universitas Muhammadiyah Palembang]. Palembang.
- Indah, F. P. S., Listiana, I., Aprilia, I., & Satriani, S. (2022). TRIGGER FACTORS OF COMPUTER VISION SYNDROME IN COMPUTER USERS. *MAP (Midwifery and Public Health) Journal*, 2(1), 36-44.
- Loh, K., & Redd, S. (2008). Understanding and preventing computer vision syndrome. *Malaysian family physician: the official journal of the Academy of Family Physicians of Malaysia*, 3(3), 128.
- Nadia, A. S., Paramita, A., & Rahman, A. O. J. M. D. J. P. k. M. F. U. (2021). Relationship between Duration of Portable Computer Use and the Incidence of Computer Vision Syndrome in Students of the Faculty of Medicine and Health Sciences, University of Jambi in 2020. 4(1), 179-184.
- Nopriadi et al. (2019). Factors related to the occurrence of computer vision syndrome in bank employees. *Media Kesehatan Masyarakat Indonesia*, 15(2): 111.
- Novitasari, W., & Khotimah, N. (2016). The impact of gadget use on social interactions of children aged 5-6 years. *Jurnal PAUD Teratai*, 5(3), 182-186.
- Priandita, N. T. (2015). Analysis of Factors Related to Computer Vision Syndrome Complaints in Internet Cafe Computer Operators in Summersari Village, Jember Regency.
- Ranasinghe, P., Wathurapatha, W., Perera, Y., Lamabadusuriya, D., Kulatunga, S., Jayawardana, N., & Katulanda, P. (2016). Computer vision syndrome among computer office workers in a developing country: an evaluation of prevalence and risk factors. *BMC research notes*, 9, 1-9.

- Reddy, S. C., Low, C., Lim, Y., Low, L., Mardina, F., & Nursaleha, M. J. N. j. o. o. a. b. p.-r. a. j. o. t. N. O. S. N. (2013). Computer vision syndrome: a study of knowledge and practices in university students. 5(2), 161-168.
- Sahitra. (2016). The Relationship Between Length of Computer Use and the Occurrence of Computer Vision Syndrome. Universitas Sumatera Utara]. Sumatera Utara.
- SDIslamAkhlaqulQuran. (2023). School Digitalization. Retrieved 3 July from <https://sd-akhlaqulquran.com/>
- Septiyanti, R. A., Fathimah, A., & Asnifatima, A. J. P. (2022). Factors Related to the Incidence of Computer Vision Syndrome in Computer User Workers at Ibn Khaldun University Bogor in 2020. 5(1), 32-50.
- Sutangi, S., Amelia, K. R., & Nuraeni, T. J. G. W. (2023). Factors related to the occurrence of Computer Vision Syndrome (CVS) in employees of PT. Kilang Pertamina Internasional RU VI Balongan. 14(1), 441-447.
- Yudia, M. A., Indriawati, A., & Heriyanto, T. (2023). The Effect of Distance Learning on Computer Vision Syndrome Complaints In Students Of The Faculty of Medicine Yarsi University Class 2020 and Its Review According to the Islamic View. Junior Medical Journal, 1(7), 888-903.