

The Effect of Eye Exercises Intervention as Myopia Booming Prevention Effort in Children During Online Learning in the Covid-19 Pandemic

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ABSTRACT

Background: During the Covid-19 pandemic, all levels of education must use online learning. Therefore, childrens use gadgets and computers more for a long time, which is made myopia causes in children. The prevalence in Indonesia shows that 10% of 66 million school children (5-19 years old) suffer from refractive errors, namely myopia. While the prevalence of myopia in children Asia is more than 5%, and children in Asia have a higher prevalence in myopia cases of about 29%. **Objective:** To determine the effect of eye exercises on reducing myopia booming in children during online learning in the COVID-19 pandemic. **Methods:** This study used a quasi-experimental design with one group pre-test and post-test design. The sample in this study were 15 respondents. The instrument used is the Snellen chart. **Results:** The results of the paired t statistic test showed that the data before and after the eye exercises intervention showed that in the right eye the p value was 0.035 ($\alpha < 0.05$), while for the left eye the p value was 0.031 ($\alpha < 0.05$). **Conclusion:** This study concludes that there is an effect of giving eye exercises intervention on reducing myopia outcomes in children.

INTRODUCTION

This coronavirus spread in Indonesia in early 2020 and was first discovered or first appeared in the city of Wuhan, China at the end of December last year (2019). This things made some countries, perhaps even all countries to implement policies to impose a lockdown in order to prevent the spread of the corona virus (Misno, 2020). The Covid-19 pandemic has brought tremendous changes to the world specially in education sector. One of them is that all levels of education are transformed to adapt suddenly and drastically to learning from home through online media. The impact has penetrated into the world of education due to the implementation of large-scale social restrictions in order to reduce engagement with one another and to maintain distance (Agustino, 2020; Ahidin, 2020; Misno, 2020). Therefore, online learning media (online) was chosen as a solution to carry out learning in the midst of the covid-19 pandemic. The impact of the pandemic on online learning is 90%. Not all of them use online learning methods (online), but some also combine them with the home visit method (Atsani, 2020).

With online media learning (online class). Means that children use gadgets and computers more, thus far causing myopia in children and

this must be overcome. The results showed that respondents who experienced myopia had poor learning behaviors such as studying habits or doing assignments late at night, often using computers, cellphones or other electronic media for a long time and paying less attention to the use of good lighting while studying. This behavior, if done frequently, can cause the muscles around the eyes to be conditioned to contract or tighten so that it can cause the eyeball to be longer and the curvature of the lens to increase so that the refractive power of the lens is too strong and causes myopia (Lenawati & Rudi, 2017).

Based on the CLEERE study (Collaborative Longitudinal Evaluation of Ethnicity and Refractive Error) states that the prevalence of myopia in adults in America is around 20-50%, and in Asian countries 85-90%. The prevalence of myopia in children in Asia is more than 5%, while children in Asia have a higher prevalence of around 29% (Musiana, Nurhayati dan Sunarsih, 2019). Meanwhile, in Indonesia, according to WHO data, 10% of 66 million school children (5-19 years) suffer from refractive errors, namely myopia (Lubis & Zubaidah, 2020).

One of the ways to overcome myopia is using the Eye exercises method, namely by performing a series of movements performed

by the eye organs to train the eye muscles, thereby reducing visual discomfort. This exercise can stimulate the eye muscles with movements that involve the eye muscles so that blood circulation increases and increases eye acuity (Gosewade, Drugkar dan Shende, 2016).

From the research results Zorena, *et al.* (2018) stated that in the pre-treatment study group the refractive power of the right eye was -1.48D and the left eye was -1.58D, then after eye exercises intervention the right eye's refractive power was -1.45D and the left eye was -1.53D. It can be concluded that there is a change in the refractive power of the right eye 0.03D and the left eye.

In the research of He.M, *et al.* (2015) stated that Eye exercises have been applied in China as an intervention to control myopia in children for more than 50 years. This stratified case-control study investigates eye exercises and their relationship to the development of myopia in junior high school children. Outcome measures were the onset and progression of myopia over two years. Of the 260 children at 1 (mean age was 12.7 ± 0.5 years). The group that performed high-quality eye exercises had a slightly lower myopia development of 0.15 D than children who did not exercise for 2 years.

In a randomized controlled trial found that children with an additional 40 minutes of outdoor time a day had 0.17 D slower myopia progression compared to controls over a 3-year period. In this study, only about 15% of the total children and about a third of those who did were found to be doing high-quality eye exercises. This shows that eye exercises are useful in controlling the development of myopia even though they must be done by children every day.

In connection with the problems above, the purpose of this study is to determine the effect of eye exercises on reducing myopia boom in children during online learning during the COVID-19 pandemic.

METHODS AND MATERIALS

This research methods was carried out using a quasi-experimental method and using a one group pre-test and post-test design. In this method, the researcher conducted a comparative analysis of myopia levels before and after eye exercise treatment. The research was conducted in the Surakarta area on July – August 2021. The instrument used in this study was the snellen chart. The instrument was used to measure the severity of the respondent's of myopia cases. The subjects in this study were 6th grade students

who experienced myopia as many as 15 respondents.

This study was conducted 3 times a day for 4 weeks (implementation of the intervention every Monday - Friday) online. Every day the respondents did 3 times eye exercises with eight different movements and had a duration of ± 20 minutes. According to Jyoti, *et al* (2015), there are several stages of eye exercise, namely palming technique, blinking technique, image number 8 technique, eye rotation technique, squeeze technique, massage technique, and coolpad technique. The eye exercises intervention was carried out simultaneously in the treatment group guided by the researcher. The respondent's pre-test data collection process was carried out before the application of eye exercises took place. Meanwhile, the post-test data collection of respondents was carried out after giving eye exercises intervention. In addition, respondents were also assisted with leaflets and animated videos of eight eye exercises to make it easier to memorize the movements.

Univariate analysis which aims to determine the frequency distribution of each variable, namely the results of eye measurements using a snellen chart on respondents before and after eye exercises intervention. The second data analysis is

bivariate analysis which is used on two related or correlated variables, namely between the independent variable and the dependent variable. This bivariate analysis will determine the effect of eye exercises intervention on reducing myopia outcomes in children. In this analysis using the paired t test statistic, which is a statistical test technique used to test the effect between 2 variables if the scale of the research variable data is in the form of a nominal scale and an ordinal scale. In health research, the level of significance ($\alpha = 0.05$), where there is a relationship (meaningful) if the *p-value* < 0.05 and no relationship if the *p-value* > 0.05 .

RESULTS AND DISCUSSION

The eye is an organ who created by God and is one of the vital organs of great importance. Humans can get as much as 80% information just by looking (Kurmasela *et al.*, 2013). Furthermore, the eye is also defined as a highly developed and complex photosensitive organ. The eye allows careful analysis of the shape, intensity of light, and color reflected by objects (Sherwood, 2013). Myopia or nearsightedness is a refractive error of the eye because the eyeball is too long so that the refraction of light is too strong or the lens is too convex due to the work of the lens

being too focused. Parallel rays of light that enter the eye without accommodation, fall at a focal point in front of the retina. Distant objects cannot be seen carefully because the incoming rays cross each other on the glass body. When the light reaches the retina, the light will spread and form a diffuse circle so that the image appears blurry when looking at distant objects, while near objects can be seen clearly even without accommodation. Myopia is usually suffered by children who have occupied school. Myopia can occur due to the process of writing or reading too close continuously, long duration of computer or video game use. In addition, myopia is one of the genetic disorders brought about by the expression of the MFRP (Membrane frizzled-related protein) gene. (Sharmila *et al.*, 2014 ; Sherwood, 2013).

One of the ways to overcome myopia is using the Eye exercises method, namely by performing a series of movements performed by the eye organs to train the eye muscles, thereby reducing visual discomfort. This exercise can stimulate the eye muscles with movements that involve the eye muscles so that blood circulation increases and increases eye acuity (Gosewade, Drugkar dan Shende, 2016).

Eye exercises are an appropriate therapy for accommodation disorders. In addition to therapy, eye exercises can help the eyes become healthy, and reduce discomfort in the eyes. Training the eyes is expected to make the eyes fresher because blood circulation in the eyes becomes smooth (Bansal dan Moudgil, 2014). Eye exercises are good for school children who are growing and developing to relax the eye muscles, reduce or eliminate eye diseases, and make the eye muscles and surrounding areas elastic and strong, and sharpen vision. According to research conducted by Pandey R, *et al* (2017) eye exercises can improve visual acuity and eye health in children with myopia. Eye exercises are carried out by observing the 20/20 technique, which means taking 20 seconds to look at objects as far as 20 meters every 20 minutes when using a gadget (Wea, Batubara dan Yudowaluyo, 2018). These eye exercises have also been applied in China as an intervention to control myopia in children for more than 50 years. The group that did high-quality exercise had a slightly lower myopia development of 0.15 D than children who did not exercise for 2 years (Kang, M. T, *et al*, 2016).

In this study, it was conducted 3 times a day for 4 weeks (implementation of the

intervention every Monday - Friday) online. Every day the respondents did 3 times eye exercises with eight different movements and had a duration of \pm 20 minutes. This is

in accordance with research conducted by Zorena, *et al.* (2018) with a dose of exercise 3 times a day for 5 consecutive days for 4 weeks.

Table 1. Test result of normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Right eye pre test	0.200	15	0.111	0.899	15	0.093
Left eye pre test	0.142	15	0.200*	0.940	15	0.379
Right eye post test	0.136	15	0.200*	0.951	15	0.544
Left eye post test	0.169	15	0.200*	0.962	15	0.731

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Based on the output table of the normality test in the Kolmogorov-Smirnov test section, it is known that the value of Sig. for the right eye pre test of 0.111; left eye pre test of

0.200; right eye post test of 0.200; and the left eye post test was 0.200. Because the value is greater than 0.05, it can be said that the data is normally distributed.

Table 2. t paired test result

Measurement result		Mean	<i>t paired test</i>	<i>p-value</i>
Right Eye	Pre test - Post test	0.58333	2.33	0.035
Left Eye	Pre test - Post test	0.51667	2.39	0.031

Based on table 2. regarding the results of the paired t test on the mean in 1 treatment group, the results for the right eye pre-post test mean 0.58333; while the mean pre-post test for the left eye is 0.51667. So it can be concluded that eye exercises can reduce children's myopia as seen from the decrease

in the mean pre-post test, there is a decrease of 0.06666. This is in line with the results of a study conducted by Zorena, *et al.* (2018) stated that in the pre-treatment study group the refractive power of the right eye was -1.48D and the left eye was -1.58D, then after eye exercises intervention the right eye's

refractive power was -1.45D and the left eye was -1.53D. It can be concluded that there is a change in the refractive power of the right eye 0.03D and the left eye.

As for the results of the analysis test using the paired t test in 1 treatment group, the results for the right eye were p value 0.035 ($\alpha < 0.05$), while for the left eye the p value was 0.031 ($\alpha < 0.05$). The p value is less than 0.05, this indicates that H_0 is rejected and H_1 is accepted, which means that there is an effect of giving eye exercises intervention on reducing myopia outcomes in children. This is in line with the results of a study conducted by Desai, R *et al* (2020) stated that this study concluded that there was a change in refractive power in the experimental group after the yoga eye exercise intervention. This suggests that there is a clinical benefit of yoga in treating individuals with myopia. The results of another study obtained by Arisandi, *et al* (2018) stated that eye exercise was effective in reducing the symptoms of computer vision syndrome. In this study, it showed that there was a significant difference on average after being given eye exercises between the experimental group and the control group.

The above study concluded that eye exercises are effective in increasing the near

point of convergence and helping to improve vision. The presumed reason behind the effect of eye exercises is that they strengthen accommodation, the power of changing the eye's focus for vision. In addition, this exercise can stimulate the eye muscles with movements that involve the eye muscles so that blood circulation increases and improves eye acuity. Maybe due to the fact that in focusing exercises the lens is converging, and it affects the accommodation power, and with proper training, this increases the accommodation power. Therefore, a longer duration is required to see clinically favorable results.

CONCLUSIONS AND SUGGESTIONS

Based on this study, it can be concluded that there is an effect of giving eye exercises intervention to reduce myopia in children after 4 weeks of eye exercises. With this research, it is hoped that it can contribute as input for children with myopia in order to reduce the severity of myopia in children, and reduce the myopia boom rate in Indonesia. In addition, suggestions for further researchers are to be able to conduct research with a longer time and for parents to pay more attention to children's activity patterns during online learning so that children's myopia is well controlled.

REFERENCES

- Agustino, L. 2020. Analisis Kebijakan Penanganan Wabah Covid-19 : Pengalaman Indonesia Analysis Of Covid-19 Outbreak Handling Policy : The Experience Of Indonesia. *Jurnal Borneo Administrator*, 16(2), 253–270.
- Ahidin, U. dkk. 2020. *Covid 19 dan Work from Home*. Desanta Muliavisitama.
- Arisandi, I. P. 2018. Efektivitas Senam Mata Terhadap Computer Vision Syndrome (CVS). *JOM FKp*, Vol. 5 No. 2 (Juli-Desember).
- Atsani, K. L. G. M. Z. 2020. Transformasi media pembelajaran pada masa Pandemi COVID-19. *Al-Hikmah: Jurnal Studi Islam*, 1(1), 82-93.
- Bansal, Yashi dan Moudgil, Tania. 2014. Computer Vision Syndrome. *International Journal of Inovative Research and Development*, 3(11), 276-279.
- Desai, R., Palekar, T., Patel, D., Rathi, M., Joshi, R., & Shah, A. 2020. Effects of yogic eye exercises for myopia among students. *Journal of Dental Research and Review*, 7 (5), 69.
- Gosewade, N., Drugkar, A. dan Shende, Vinod. 2016. Effect of Pranayama and Eye exercises on Visual Acuity of Medical Students : A Case Control Study. *International Journal of Contemporary Medical Research*, 3(4), 1133-1136.
- He.M, *et al.* 2015. Refractive Error and Visual impairment in urban children in southern China. *Invest Ofthalmol Vis Sci*. 2004 ;45:793-9
- Jyoti, *et al.* 2015. Computer Vision Syndrome (CVS)- Prevention and Management. *Journal of Int J Ayu Pharm Chem*, 2(2), 31-39.
- Kang, M. T., Li, S. M., Peng, X., Li, L., Ran, A., Meng, B., ... & Wang, N. 2016. Chinese eye exercises and myopia development in school age children: a nested case-control study. *Scientific reports*, 6(1), 1-8.
- Kurmasela, *et al.* 2013. Hubungan waktu penggunaan laptop dengan keluhan Penglihatan Pada Mahasiswa Fakultas Kedokteran Universitas Sam Ratulangi. *Jurnal e-Biomed* 1(1):291-299.
- Lenawati H, dan Rudi E. 2017. Hubungan Perilaku Belajar dengan Kejadian Myopia (Rabun Jauh). *Jurnal AKP No. 6*.

- Lubis, R. R., & Zubaidah, T. S. H. 2020. The relationship between the incidence of Myopia with the use of gadgets in students of Bersama Private Middle School Berastagi.
- Misno, D. 2020. *Covid-19 (wabah, fitnah, dan hikmah)*. Amma Alamih.
- Musiana, M., Nurhayati, N., Sunarsih, S., 2019. Faktor Risiko yang Berhubungan dengan Kejadian Myopia pada Anak Usia Sekolah. *Jurnal Ilmu Keperawatan Sai Betik*.
- Pandey, R., Bihari, R., & Pandey, A. 2017. Effect of Eye Exercise on Myopia in Children Aged Between 10-15 Years-A Randomized Clinical Trial. *International Journal for Advance Research and Development*, 2 (1).
- Sharmila F, *et al.* 2014. Genetic Analysis of Axial Length Genes in High Grade Myopia from Indian Population. *Journal Meta Gene*. Vol. 1 (1) : 165,166,168,170.
- Sherwood L. 2013. *Human Physiology From Cells to System, Eight Edition*. USA: Brooks/Cole Cengage Learning.
- Wea, M. H., Batubara, S. O. and Yudowaluyo, A. 2018. Hubungan Tingkat Penggunaan Smartphone dengan Kejadian Miopia pada Mahasiswa Keperawatan Angkatan VII STIKES Citra Husada. *CHMK Applied Scientific Journal*, 1(1), pp. 11–17.
- Zorena, K., Gładysiak, A., & Ślęzak, D. 2018. Early intervention and nonpharmacological therapy of myopia in young adults. *Journal of ophthalmology*, 2018.