THE EFFECT OF EYE EXERCISES ON REDUCING EYE FATIGUE IN ADMINISTRATIVE WORKERS IN THE PLASTIC MANUFACTURING INDUSTRY

Ryan Raihan[1], Bachtiar Chahyadhi[2]*, Hengky Ditya Eko Nugroho[3]

[1' 2' 3']Occupational Safety and Health, Vocational School, Sebelas Maret University Corresponding author email address:
bachtiarchahyadhi@staff.uns.ac.id

ABSTRACT

The development of technology, especially in the field of information technology, requires individuals to interact with computers. Computers are an important part of several work sectors, especially in the office sector for activities such as entering data, processing data, correspondence activities. The activities of computer user workers require accuracy so that the work requires a long time and detailed vision, so without realizing it can trigger eye disease, namely eye fatigue. Complaints of eye fatigue have symptoms in the form of a throbbing sensation around and behind the eyeball area, double vision, blurred vision, difficulty focusing vision, sore eyes, redness, and watery eyes, headaches accompanied by nausea and dizziness. This study aims to determine the effect of eye exercises on eye fatigue in computer user workers at PT X. This study uses the type of research quasi experiment with nonequivalent control group design. Respondents were taken from PT X computer user workers totaling 60 people from a total of 150 employees. The sampling technique used purposive sampling technique. This study used an eye fatigue questionnaire as a research measurement tool by providing eye exercise interventions to the experimental group. Data analysis technique used was the contingency coefficient test. The results showed that there was a significant difference in eye fatigue between the experimental group and the control group ($p=0.044$; $p<0.05$).

Keywords: Eye Fatigue, Computer, Eye Exercises

INTRODUCTION

Technological developments, especially in the field of information technology, require individuals to interact with computers. The use of computers today is increasingly widespread and has become an integral part in increasing human productivity, both in the context of education and work. The percentage of computer use in Indonesia continues to increase.

The percentage of computer ownership in households reached 18.83% and 78.18% for the use of internet access (BPS, 2020). The location of computer use by Indonesians is at home (61.92%), office (42.08%) and school (12.12%). Computers are an important part of several work sectors, especially in the administration sector. The activities of computer user workers require accuracy so that the work requires a long time and detailed vision, so without realizing it can trigger eye disease, namely eye fatigue (Berliana & Rahmayanti, 2017).

The American Optometric Association (AOA) defines eyestrain as a compound eye and vision problem related to near vision that a person experiences while using a computer or other display device for long periods of time continuously (AOA, 2016). Eye fatigue complaints have symptoms that include a throbbing sensation around and behind the eyeball area, double vision, blurred vision, difficulty focusing vision, eye pain, redness, and watery eyes, headaches accompanied by nausea and dizziness

PT X is one of the industries engaged in the manufacturing sector that produces cement sacks, rice sacks and also sewing threads for sacks. Basically, the work in this company is separated into 2 parts, namely office work and production work. Office activities that are carried out daily are entering, processing and monitoring data where these activities cannot be separated from the use of computers.

Researchers conducted an initial survey by distributing eye fatigue questionnaires to 10 administrative workers at PT X, and obtained results that 70% of respondents experienced eye fatigue. Symptoms of eye fatigue experienced by workers are as follows: pain

around the eyes, blurred vision, double vision, red eyes, sore eyes, watery eyes, difficulty focusing, headaches and dizziness.

In addition, data obtained on the average age of 35 years, the average tenure of 5 years and the average work using a computer for > 4 hours every day. This is in line with research conducted by Putri (2022) that using a computer for 4 hours continuously is more at risk of CVS than working in front of a computer for less than 4 hours continuously. Complaints of eye fatigue can be prevented or reduced risk, one of which is by relaxing the eyes in the form of eye exercises.

Research conducted by Nau et al, (2022) where workers with a work period of> 3 years have a 16.677 times risk of experiencing eye fatigue complaints compared to workers with a work period of < 3 years.

METHOD

This study used an experimental design with a pre-experimental approach. The research design used is a quasi-experiment with a non-equivalent control group design, with an intervention in the form of eye exercises (Sugiyono, 2016). The research location is the administration section of PT X Karanganyar which is located on Jalan Raya Palur Km.8, Jetis Village, Jaten District, Karanganyar Regency, Central Java Province. The research was conducted from May to July 2024.

The study population consisted of 150 employees of the computer user administration section of PT X in Karanganyar. The sampling technique used was non-probability sampling, namely purposive sampling, where the data collection technique takes into account certain criteria. The inclusion criteria used were willing to be respondents and administrative employees who used computers for more than 4 hours, and workers in good health during the study, while the exclusion criteria were leaving the research location when observations were made and workers in ill condition. The number of samples in this study were 60 respondents (Sumardiyono et al, 2020).

This study divides the groups into 2, namely the intervention group

and the control group. How to divide respondents through the spin the wheel application. Researchers entered all the names of respondents as many as 60 workers, then the application will divide randomly into intervention groups and control groups of 30 respondents each.

Researchers provided eye exercise training adopted from Oei Gin Djing (2006) by performing 7 eye exercise movements, namely eye movement to the right and left, eye movement looking up and down, diagonal movement from the bottom left corner, diagonal movement from the bottom right corner, turn the eyeballs clockwise, turn the eyeballs counterclockwise, and raise the thumbs parallel to the eyes then bring them closer and further away from the eyes.

Providing eye exercise movement interventions through educational video media with a duration of 5 minutes and practicing eye exercise movements for 5 minutes. The eye exercise intervention was conducted twice a day for 3 weeks. This research focuses on providing training specifically on eye exercises through educational videos and eye exercise practice. The purpose of this study is to reduce eye fatigue complaints in administrative workers of PT X in Karanganyar.

This research measuring instrument uses an eye fatigue complaint questionnaire which contains 9 questions about eye fatigue complaints. The validity test results obtained a result of 0.6319, while the reliability test results obtained a Croanbach's alpha value of 0.876. This research data analysis uses the contingency coefficient test through SPSS version 25 software (Ghazali, 2018).

RESULTS AND DISCUSSION

Table 1. Respondent Characteristic

Variable	n	%
Age		
≤ 40 Years	27	45
> 40 Years	33	55
Gender		
Male	27	45

Variable	n	%
Female	33	55
Worked Period		
≤ 4 Years	21	35
> 4 Years	39	65
Eye to Screen Distance		
< 50 cm	33	55
≥ 50 cm	27	45
Duration of Screen Starting		
≤ 4 Hours	0	0
> 4 Hours	60	100
Frequency of Breaks		
≤ Every 2 Hours	26	43
> Every 2 Hours	34	57

Table 1 above presents frequency distribution data on the characteristics of respondents aged ≤ 40 years as many as 27 people (45%). The majority of respondents' gender is female as many as 33 people (55%). The majority of working period > 4 years as many as 39 people (65%). Respondents mostly work using computers with a distance of < 50cm with 33 people (55%). All respondents (100%) use a computer for > 4 hours and as many as 34 people (57%) take a break every > 2 hours.

In this study, the majority of respondents were > 40 years old, namely 33 people (55%). As we age, the human body experiences decreased function, including decreased visual function. These physiological changes are a natural part of the aging process that affects various aspects of health, including visual ability. Human eye health is usually in optimal condition during the age range of 20 to 40 years.

During this period, the eyes tend to be in a normal state and function properly. The eye needs accommodation power to adjust the distance of objects seen to fall right on the retina, the eyes of a person aged> 40 years have maximum accommodation so that the eyes will experience fatigue more easily (Dossari et al, 2022).

The majority of PT X workers in this study had a working period of more than 4 years, as many as 39 respondents (65%) and the rest had a working period of <4 years as many as 21 respondents (35%). In other words, the longer a worker is in the workplace, the more likely they are to experience fatigue, including eyestrain, due to prolonged exposure to risk (Tarwaka, 2017).

The majority of PT X workers in this study stared at the computer screen while working with a distance of <50 cm as many as 33 people (55%). Focusing the eyes on close objects can trigger excessive stress on the eyes which can trigger CVS. The American Optometric Association recommends using a computer with an ideal distance between the eyes and the computer screen of 50 cm.

Based on the duration of computer use, the results of this study show that the average respondent uses a computer for more than 4 hours every day. The use of more than 4 hours is based on administrative work including making work plans, making job evaluations, and document preparation work so that it requires workers to use the computer for longer, the risk of experiencing eye fatigue is also increasing (Darmawan, D & Wahyuningsih, 2021).

This is in line with the theory which states that long-term computer use can cause eye strain and fatigue (Anggrainy et al., 2020). This study supports the findings of which states that the duration of computer use affects eye fatigue, because it can reduce the accommodation ability of the eye (Nurhalimah, et al., 2020).

In this study the majority of respondents rested more than 2 hours once as many as 34 people (57%). Respondents who take more frequent breaks can give the eye muscles a chance to rest so that they have fewer symptoms of eye fatigue such as watery eyes and blurred vision. This is in line with the theory put forward (Suma'mur, 2014) which states that resting the

eyes regularly can improve visual comfort for computer users and reduce the risk of eye fatigue. In addition, NIOSH recommends taking a 15-minute break every 2 hours of working with a computer (Joshi, et al, 2017).

Table 2. Analysis of eye exercises on eye fatigue complaints in the control and experimental groups

Variable	Eye Fatique		Total	Sig
Groups	Not Fatique	Fatique		
Contol	1	29	30	0.044
Experiment	6	24	30	
Total	7	53	60	

Table 2. explains the results of data analysis using the contingency coefficient test, namely the provision of eye exercises in the control and experimental groups on eye fatigue complaints of administrative workers of PT X Karanganyar there is a significant difference as evidenced by the sig. value of 0.044. This can occur because the provision of interventions in the form of eye exercises is able to provide relaxation due to eye muscle tension (Candra & Kartadinata, 2018).

Eye fatigue can also be triggered by using a computer for more than 4 hours, causing the eye muscles to work excessively, resulting in eye complaints. Giving eye exercises aims to help the eyes relax (Sucipto et al, 2020). According to Alficandra et al., (2021) although it cannot cure the visual impairment completely, eye exercises can help the eyes become comfortable.

Workers who have been operating a computer for more than 4 hours will begin to feel symptoms of eye fatigue such as sore eyes, blurred vision, and difficulty focusing in vision. This condition causes the muscles to work optimally and forcefully so that the eye muscles experience tension. The tension of the muscles in the eye is greater so that there is an increase in lactic acid, causing eye fatigue (Chandraswara & Rifai, 2021).

In this study, the control group served as a comparison for the

experimental group who received special treatment in the form of eye exercises. In accordance with the findings of Nikmah et al. (2023), the control group that was not given the eye exercise intervention did not show a significant difference between the pre-test and post-test results. This result confirms that eye exercises have a special effect that is not experienced by the control group who did not do eye exercises. The results of the study in the experimental group performed eye exercises every 2 hours in between working in front of the computer with a frequency of 6 times a week within a period of 3 weeks (Dewi & Novia, 2020).

Research related to the provision of eye exercises was conducted by (Solikah & Hasnah, 2022), namely by applying several eye exercise movements can increase eye acuity, so that the provision of eye exercises is very effective in reducing complaints of eye fatigue, considering that eye exercise therapy is easy to do by all groups and does not require a special place (Maisal et al., 2020).

CONCLUSION

The conclusion of this study is that the provision of eye exercises for administrative workers of PT X Karanganyar every 2 hours in the work break with a frequency of 6 times a week within a period of 3 weeks is able to make a difference between the experimental group and the control group.

ACKNOWLEDGEMENTS

The researcher would like to thank you our respondent and PT X Karanganyar who have helped researchers in conducting research

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