DETERMINANT FACTORS EYE FATIGUE COMPLAINTS OF CUSTOMER CARE WORKERS IN A NATIONAL TELECOMMUNICATIONS COMPANY

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Abstrak
Tujuan dari penelitian ini adalah untuk mengidentifikasi variabel-variabel yang mempengaruhi keluhan kelelahan mata pada pengguna komputer. Penelitian ini bersifat cross-sectional dan kuantitatif, dengan menggunakan pendekatan deskriptif analitik. Seluruh pekerja menjadi populasi penelitian. Terdapat seratus sampel penelitian. Dalam penelitian ini, kuesioner digunakan sebagai alat pengumpul data. Dalam penelitian ini, analisis univariat dan bivariat dilakukan untuk analisis data. Dari hasil penelitian, dapat disimpulkan bahwa lebih dari 90% karyawan yang menggunakan komputer dilaporkan mengalami kelelahan mata. Usia pengguna komputer dan gejala kelelahan mata berkorelasi secara signifikan. Kelainan refraksi dan gejala kelelahan mata di antara pengguna komputer tidak berkorelasi secara signifikan. Tidak ada hubungan yang terlihat antara keluhan kelelahan mata pengguna komputer dan istirahat mata. Jarak antara layar dan keluhan kelelahan mata pengguna komputer tidak berkorelasi secara signifikan. Kondisi pencahayaan dan keluhan kelelahan mata pengguna komputer berkorelasi secara signifikan.
Kata kunci: Keluhan Kelelahan Mata, Pengguna Komputer, Pekerja, Kelainan Refraksi

Abstract
The purpose of this study is to identify the variables influencing computer users' complaints of eye tiredness. This study is cross-sectional and quantitative, employing analytical descriptive approaches. All workers make up the study's population. There were one hundred research samples. In this study, a questionnaire was utilized as the data gathering tool. In this study, univariate and bivariate analyses were performed for data analysis. Drawing from the research findings, it can be deduced that over 90% of employees who use computers reported experiencing eye tiredness. The age of computer users and their symptoms of eye fatigue are significantly correlated. Refractive errors and symptoms of eye fatigue among computer users do not significantly correlate. There is no discernible link between computer users' complaints of eye fatigue and eye rest. The distance between the display and computer users' complaints of eye fatigue is not significantly correlated. Lighting conditions and computer users' complaints of eye fatigue are significantly correlated.
Keywords: Complaints Of Eye Fatigue, Computer Users, Worker, Refractive Errors

INTRODUCTION

Excessive efforts made by the visual system, which is not in optimal condition to achieve visual acuity, might result in eye fatigue. Eye tiredness is a subjective ailment that can be brought on by overusing the eye muscles. Because the muscles in the eyes have to work hard, especially when they have to look at close things for extended periods of time, problems with the eyes might arise such as tired, tense, or hurting eyes (Tannady et al., 2019). The ciliary muscle, which is responsible for focusing the eye lens, and the iris muscle, which controls the amount of light entering the eye, make up the eye muscles themselves. These three exterior muscle cells control the movement of the eyeball. The eyes can become fatigued from any activity that involves making these muscles work very hard. Sore eye symptoms typically show up after working for a few hours. The eyes will hurt or feel uncomfortable when the muscles that control them get fatigued. Eye tiredness is caused by extreme strain on the muscles that support the eyes, such as the accommodation muscles during tasks requiring close attention or the retina due to uneven contrast (Henny, 2021).

There are three types of symptoms associated with eye fatigue: visual symptoms such headaches and nausea, ocular symptoms like discomfort in both eyes, and visual symptoms like double vision. Physical symptoms including headaches, double vision, nighttime glare, red eyes, inflammation of the lining of the eyes, decreased visual acuity, and other vision issues can be brought on by eye tiredness.

In the workplace, eye fatigue also causes decreased productivity, a rise in accident rates, and an increase in visual complaints (Padmanaba, 2016). Irritations including watery eyes and red eyelids, headaches, double vision, and a decrease in convergence and accommodation forces can all be brought on by eye tiredness. Employees who use computers for their regular work typically experience eye fatigue. Computer-related visual issues can result in a number of symptoms, such as headaches, light sensitivity, blurred vision, and weary, dry eyes. Eye tiredness symptoms include headaches, dizziness with nausea, blurred or double vision, aching eyes, red or watery eyes, blurred vision, headaches, and discomfort or throbbing around the eyes (Dharmawan et al., 2021).

Work equipment (the size of things on the screen and how they are displayed), the work environment (the lighting in the room, the monitor), the work design (the features of the documents, the length of the workday), and individual characteristics (a medical history) can all have an impact on eye fatigue. There are internal as well as exterior variables that affect eye fatigue. Ocular and systemic variables are two categories of internal factors (Prasetio, 2016). The degree of lighting and the distribution of light in the workspace, meanwhile, have an impact on external factors. Visual symptoms can also result from inappropriate lighting, glare from the monitor, the size of objects on the monitor screen that are difficult to read, and eye rest patterns (Fabiani & Tan, 2021). The worker's age also influences eye fatigue. Factors that influence visual performance include the individual's own abilities, viewing distance to the object, lighting, duration, object size, glare, and contrast. Computer use throughout the world has increased over time. With computers, work can be completed easily and quickly. However, computer use also has an effect on health. Using computers can cause stress. Computer operators have higher levels of stress compared to other jobs (Santosa, 2016).

In various studies conducted, it was found that computer vision syndrome (CVS) or eye fatigue was found to be associated with continuous use of monitors or video display terminals (VDT). There are 60 million people who suffer from vision problems because they use video display terminals (VDT) for three hours or more a day. Eighty percent of persons who use computers for longer than three hours a day are said to get eye fatigue. As we continue to work long hours and rely on computers, eye fatigue, vision issues, and eye health deteriorate. Office workers are among the groups most at risk for developing eye tiredness; according to multiple studies, 42% of office workers have this issue (Ervina et al., 2021). Also, research revealed that 90% of computer operators reported experiencing eye tiredness. In Indonesia, eye tiredness is a common symptom of prolonged computer use that requires constant eye contact. Because the eyes become accustomed to staring at a monitor screen all the time, prolonged computer use can cause dryness and fatigue in the eyes. In order to avoid this, it is important to consider visual ergonomics when using a computer, including the position of the monitor in relation to the eyes, room lighting, and the distance between the eyes and the screen. This will ensure that employees are comfortable looking at their job (Alit, 2021).

The object of this study is a state-owned enterprise, an industry that operates in the field of communication services for the country (Padmanaba, 2016). One of the sub-divisions is the Corporate Customer Care Center (C4), which is a company operating in the telecommunications sector to handle and coordinate disruptions to Corpotare customers who use products. In handling disruptions that occur in company services, workers are very dependent on computers and use them for long periods of time and continuously, which can have negative consequences on body health, especially eye health (Henny, 2021). Based on information from management, until now no research activity has been carried out on workers' health related to eye health problems, especially eye fatigue in computer users.

METHOD

Because the independent and dependent variables will be observed simultaneously in this study, it is a cross-sectional study employing analytical descriptive methods (period). All workers make up the study's population. In the meantime, all computer users in the customer service division made up the example criteria. There were one hundred research samples. Primary data refers to information that researchers obtain directly from employees through the use of measuring tools and questionnaires. Secondary data includes information like staff count, company profiles, and other details that can be found by looking through documents, records, and reports from connected businesses. Following are the processes that all collected data—primary and secondary—will go through in processing: modifying and reviewing the questionnaire to ensure that the responses are accurate, comprehensive, pertinent, and consistent. Transforming data in the form of letters into data in the form of numbers is known as coding. The purpose of this coding exercise is to expedite data entry and simplify data analysis. In this study, data entry into the computer and questionnaire

completion both involved coding. Data entry: processing the data for analysis comes next, following the completion of all surveys and the coding process. Data processing is the process of entering questionnaire data into a computer system using a software program. Data cleaning is the process of going over previously entered data one more to make sure there are no errors. In this study, univariate and bivariate analyses were performed for data analysis.

RESULTS AND DISCUSSION

The research's findings indicate that the majority of employees report having eye fatigue. This is evident from the amount of time employees spend on computers, which sometimes exceed five hours every day. There are 60 million people who suffer from vision problems because they use video display terminals (VDT) for three hours or more a day. The findings of earlier research on monitor users in the Swiss watch manufacturing industry, which found significant differences regarding complaints or eye disorders between monitor users who worked 6–9 hours per day and those who worked less than four hours per day, also support this. In this study, it was discovered that workers aged <40 years mostly experienced complaints of eye fatigue. The most common complaint from employees is eye tiredness, regardless of whether they have refractive problems or not, as well as if their monitor distance is less than or greater than 50 cm. Every employee who doesn't take breaks for their eyes complains, while the majority of those who do report experiencing eye tiredness. Most people operate in illumination conditions with less than 300 lux, and some employees report experiencing eye strain. It is aching eyes that are the most common sort of eye fatigue symptom reported by workers. This complaint arises due to the high frequency of working in front of the monitor. If the eyes are focused on a task, then they are open for too long without blinking, so the surface of our eyes will become dry because the tears that wet them have evaporated. A continuously dry surface of the eye will cause the surface cells of the eyeball to become unhealthy, making them feel sore.

In this study, the percentage of workers aged < 40 years was greater than that of workers aged ≥ 40 years, namely 92% and 8%. Statistics studies revealed a strong correlation between complaints of eye fatigue and age. Among all employees over 40, some report feeling tired eyes. Additionally, the OR value for the age variable is 0.02 based on the bivariate analysis results. This suggests that employees over 40 are 0.03 times more likely than employees under 45 to report feeling tired in their eyes. The statistical test indicates a minimal degree of risk, however there is a strong correlation between ocular fatigue and the age variable. It is possible to prevent complaints of eye fatigue among workers under 40 years of age if posture and work patterns are properly regulated, according to the findings of study and observations. Efforts that can be made to minimize complaints of eye fatigue for computer users related to age include the transfer of workers with the highest possible vision. Young workers must perform nighttime work, but as they get older, they can move on to jobs that require less precision.

A refractive error is a condition where a clear image is not formed on the retina. Fatigue in the eyes with refractive errors occurs due to eye accommodation to be able to see the subject more clearly. In this study, some workers had refractive errors, and most of these workers experienced complaints of eye fatigue. Refractive error sufferers usually experience complaints of headaches, especially in the nape or forehead area, watery eyes, drowsiness quickly, burning in the eyes, soreness in the eyeballs, and blurred vision. Of the 55% of workers who have refractive errors and the 40% of workers who do not have refractive errors, most of them both complain of eye fatigue. In this study, there was no significant relationship between refractive error variables and complaints of eye fatigue. This might happen because, based on the results of observations, some workers who have refractive errors have corrected them by using lenses that suit their symptoms and vision needs, either by using glasses or contact lenses. The weakness of this study is also that it did not examine when workers started experiencing refractive errors, so it cannot be ascertained whether these refractive errors occurred as a result of workers using computers while they were working. Theoretically, someone who has refractive errors without correction can cause eye fatigue, whereas someone who uses a computer for more than four hours a day tends to experience refractive errors.

Efforts that can be made to minimize complaints of eye fatigue for all workers are carrying out regular eye examinations so that if there are abnormalities in the eyes, treatment or therapy can be immediately carried out on the eyes, and using special computer glasses (anti-glare glasses). These glasses function to reduce pain, especially in the eye nerves due to working too long in front of the monitor. The next effort that can be taken for workers who already have reflection disorders is to use a

monitor. The next step that can be taken by workers who already have glasses specifically designed for using computers is that the top part of the lens is for viewing the computer, and the bottom part is for reading. Avoid using contact lenses when working with computers because eye fatigue will be felt more quickly. This can happen because the eyes that are focused on the monitor screen will rarely blink, so the eyeballs quickly become dry. Dry eyeballs cause friction between the lens and eyelids. An air-conditioned room will further aggravate the friction because the air in the air-conditioned room will be dry, so tears will evaporate.

It is known that 20% of workers and 80% of workers did not take breaks for eye care, according to the univariate analysis results. Eye tiredness is a common complaint among workers who don't take breaks, and it affects the majority of workers who do take breaks. There is no discernible correlation between the occurrence of complaints of eye fatigue and the eye rest variable, according to the findings of the bivariate analysis. This may occur because it is related to other variables such as insufficient lighting and the presence of refractive errors in workers that have not been corrected, so that even though they have taken a rest, their eyes still experience complaints of eye fatigue. Another factor that may occur in the field is that workers do not understand how to take proper eye rest between work activities, so the rest they take does not have a significant effect on complaints of eye fatigue. Eye rest for a computer operator is very necessary because the operator's eyes are used to seeing at a fairly close distance, so their eyes are always accommodated and focused on the monitor screen. After eight working hours a day or forty working hours a week, workers who use computers are advised to take ten minutes of relaxation per hour. One way to avoid eye strain is to look at an item or objects with a different focus, and it's best to do so from a distance greater than the distance between the eye and the monitor. The procedure is to focus on an item at least 20 feet away for 20 seconds, blink, close your eyes, and then gently open them.

In the monitor distance variable, the results showed that both workers who worked with a monitor distance < 50 cm, namely 22%, and with a monitor distance ≥ 50 cm, namely 79%, mostly experienced complaints of eye fatigue. Based on research results, the average distance between workers is 58 cm. The monitor distance variable and reports of eye fatigue did not significantly correlate, according to the bivariate analysis's findings. Other variables, such inadequate illumination, could be the cause of this, leading to complaints of eye tiredness from workers at monitor distances of both less than or equal to fifty centimeters. Another element that may contribute to complaints of eye strain is the monitor screen's size, which can reach 21 inches. This is because larger monitor screens emit more glare. Eye tiredness can also be accelerated by a bright monitor screen display, especially when hot colors like red, yellow, purple, and orange are present. In addition, reflected light (glare) from windows, lamps, and other sources on the monitor screen will aggravate eye strain. Paying attention to the distance between the eyes and the object being viewed can help minimize complaints of eye tiredness because when the eyes are accustomed to close-up vision, they are under a lot of pressure to perform accommodation and convergence processes.

Accommodation is the process when the eye changes or adjusts focus to see something from a certain distance so that the object being seen can be focused, while convergence is a movement made by the eye to avoid double vision. So the farther the viewing distance of the eye object, the smaller the possibility of eye irritation due to excessive accommodation and convergence processes. Another effort related to the monitor itself is to place the monitor screen in such a way that there is no reflection of light from other light sources, such as workroom lights and windows, which can cause glare to the eyes. Then backlight the computer screen with a cool color, for example, grayish white with contrasting font colors. It is necessary to install protective glass on the computer monitor screen to reduce radiation and glare. Avoid using fonts that are too small (unless you have to). The font that is considered normal is font 12. Anything smaller than this will cause your eyes to get tired quickly reading it. Monitor screen resolution certainly has a big influence on the sharpness of letters and images.

Bivariate analysis of the lighting level variable revealed that most workers who worked in environments with lighting levels less than 300 lux complained of eye fatigue. The study found a noteworthy correlation between lighting intensity and reports of eye fatigue. It is also known from the results of this bivariate study that respondents who work with lighting levels less than 300 lux are 30 times more likely to report complaints of eye fatigue than respondents who work with lighting levels greater than 300 lux. The study's findings support earlier research, which found that illumination levels and eye fatigue have a highly significant positive link (p-value = 0.002). In companies, adequate levels of work space lighting are only found in the parts that are close to the window glass. Meanwhile, most

of the other rooms do not have access to direct sunlight. Of the 50 work desks whose lighting levels were measured, only three desks had lighting that met lighting standards. Thus, these conditions are certainly not in accordance with lighting standards in computer rooms and ergonomics concepts, which seek to improve physical and mental health and create safe, comfortable, and healthy working conditions and environments in order to achieve increased productivity, reduced work-related accidents, and fatigue.

Lack of lighting in the workplace can cause eye fatigue because workers will move their eyes closer to objects to increase their size. This will make the eye's accommodation process more forced and can cause double or blurred vision. The company can take steps to improve subpar lighting levels so that employees don't report experiencing eye fatigue. These steps include maximizing natural lighting by combining artificial and natural lighting to increase workplace lighting, increasing the wattage of lighting in the workspace, and repositioning lightbulbs to produce the best possible illumination. Only age and illumination level, out of all the variables examined, were significantly correlated with reports of ocular fatigue. According to the analysis's findings, lighting conditions are assumed to be the primary determinant of computer users' complaints of eye fatigue.

CONCLUSION

The study's findings suggest that while less than 10% of workers reported experiencing eye fatigue, nearly all computer-using employees did. The age of computer users and their symptoms of eye fatigue are significantly correlated. Refractive errors and symptoms of eye fatigue among computer users do not significantly correlate. There is no discernible link between computer users' complaints of eye fatigue and eye rest. The distance between the display and computer users' complaints of eye fatigue is not significantly correlated. Lighting conditions and computer users' complaints of eye fatigue are significantly correlated. The author realizes that there are limitations and weaknesses in this research, including: Measuring eye fatigue is only subjective, so it does not yet have a completely accurate level of data validity. Not checking the display settings on the monitor screen.

Some suggestions that can be recommended to overcome or minimize work stress in nurses are as follows: Companies are expected to provide lighting in the room in accordance with the recommended standards for computer work spaces, namely 300 lux. To improve the quality of lighting in the work space, increase the wattage, replace dead, dim, or flickering lights, and maintain lighting sources and clean them regularly. It is necessary to install protective glass on the computer monitor screen to reduce radiation and glare. Carry out regular eye examinations to determine the condition of eye function periodically so that work-related diseases, especially eye disorders, can be prevented at an early age. It is necessary to provide education for workers regarding good attitudes when working with computers. All workers should use special computer glasses, and workers who have refractive errors should avoid using contact lenses when working on computers because eye fatigue will be felt more quickly. Applying the 20-20-20 method, take a 15-20-second break for every 20-25 minutes of work by looking at a distance of 20 feets so that your eyes don't get tired quickly from constantly focusing on staring at the monitor screen. For other researchers, this is to measure eye fatigue objectively using an eye fatigue level measuring instrument (reaction timer) so that the level of eye fatigue can be determined accurately. Future researchers are expected to include other variables thought to be related to eye fatigue that were not examined in this study using a cohort study design.

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