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FACTORS RELATED TO EYE FATIGUE IN CUSTOMER SERVICE EMPLOYEES 2022

FAKTOR - FAKTOR YANG BERHUBUNGAN DENGAN KELELAHAN MATA PADA KARYAWAN BAGIAN CUSTOMER SERVICE TAHUN 2022

Research Report
Penelitian

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A B S T R A C T

Background: *Eye fatigue is a symptom caused by excessive efforts of the visual system, which is in less than perfect condition to obtain visual acuity. This is influenced by gender, duration, and distance of viewing the monitor.* ***Purpose:*** *Analyze the factors and images related to eye fatigue in customer service employees at PT X in 2021.* ***Method:*** *Descriptive study with cross-sectional design with the total sampling method. The sample in this study was 50 people. The population in this study was 50. This research was conducted on December 27 – January 5, 2022. Data collection was obtained by collecting primary data and secondary data. Data were analyzed by univariate and bivariate using the Chi-square test.* ***Result:*** *That the highest proportion is found in employees who experience eye fatigue complaints as many as 44 people (88%), in employees aged ≤40 years as many as 42 people (84%), employees who have female sex as many as 32 people (64%), employees who have a working period of >3 years as many as 45 people (90%), had computer use >8 hours a day as many as 46 people (92%), saw a monitor distance of 50 cm as many as 38 people (76%), and there was a relationship between gender (p-value = 0.001), duration of computer use (p-value = 0.004), monitor viewing distance (p-value = 0.002) with the incidence of eye fatigue in customer service employees at PT X in 2022.* ***Conclusion:*** *The results show that eye fatigue does not get worse by placing the computer in such a way that there is no light reflection, conducting periodic medical check-up, and educating employees to intersperse computer use time.*

A R T I C L E I N F O

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A B S T R A K

Latar belakang: Kelelahan mata adalah suatu gejala yang diakibatkan oleh upaya berlebihan dari sistem penglihatan yang berada dalam kondisi kurang sempurna untuk memperoleh ketajaman penglihatan. Hal ini dipengaruhi oleh jenis kelamin, durasi, dan jarak melihat monitor. **Tujuan:** Mengetahui faktor–faktor dan gambaran yang berhubungan dengan kelelahan mata pada karyawan bagian *customer service* di PT X tahun 2022. **Metode:** Jenis penelitian kuantitatif dengan menggunakan desain *cross-sectional* dengan metode *total population*. Sampel pada penelitian ini berjumlah 50 orang. Populasi dalam penelitian ini sejumlah 50 orang. Penelitian ini dilakukan pada tanggal 27 Desember – 5 Januari 2022. Pengumpulan data diperoleh dengan cara pengambilan data primer dan data sekunder. Data dianalisis secara univariat dan bivariat menggunakan uji *Chi-square*. **Hasil:** Proporsi tertinggi terdapat pada karyawan yang mengalami keluhan kelelahan mata sebanyak 44 orang (88%), pada karyawan yang berusia ≤40 tahun sebanyak 42 orang (84%), karyawan yang memiliki jenis kelamin perempuan sebanyak 32 orang (64%), karyawan yang memiliki masa kerja >3 tahun sebanyak 45 orang (90%), durasi penggunaan komputer >8 jam per hari sebanyak 46 orang (92%), jarak melihat monitor ≤50 cm sebanyak 38 orang (76%), dan terdapat hubungan jenis kelamin (*p-value* = 0,001), durasi penggunaan komputer (*p-value* = 0,004), jarak melihat monitor (*p-value* = 0,002) dengan kejadian kelelahan mata pada karyawan bagian *customer service* di PT X tahun 2022. **Kesimpulan:** Hasil penelitian menunjukkan bahwa kelelahan mata dapat dicegah dengan meletakkan komputer dengan jarak minimal 50 cm, sehingga tidak terdapat pantulan cahaya, melakukan pemeriksaan *medical check-up* berkala, melakukan edukasi kepada karyawan agar menyelingi waktu penggunaan komputer.

Kata kunci:
Kelelahan mata, Jarak, Durasi, Jenis kelamin, Masa kerja

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INTRODUCTION

Eye fatigue, according to medical science, is a symptom caused by excessive efforts of the visual system, which is in an imperfect condition to obtain visual acuity. Fatigue or eye strain is a common condition that bothers people and rarely causes a severe condition. However, sometimes eye fatigue is a sign that the eye condition is unhealthy and requires medical attention. Eye fatigue can arise from reading, writing, and driving for long periods. Using and looking at a computer or smartphone screen for long periods can also cause eye fatigue (Ansorge, 2014).

Based on research (Firdani, 2020), complaints of eye fatigue in computer operator workers stated that there was a significant relationship between age and refractive errors. There are 52.5% of operators aged 40 years and over (Dewi *et al*., 2010). The era of technological development, like today, requires everyone to interact with computer devices. Generally, today the role of computers is comprehensive. Many people spend their time in front of the computer for at least 3 hours a day. Without realizing it, working for a long time in front of a computer can cause negative health problems, both physically and mentally, for the operator (Yuliana, 2018). Based on the results of the study by Siagian *et al*. (2017), factors related to eye fatigue are the age where the older a person's age decreases the accommodation power of the eye to see objects, gender, and lighting factors that are not in accordance with the lighting threshold value in the workspace. Factors affecting eye fatigue are work equipment, work environment, work design, and individual characteristics. Factors that influence include age, eye refraction abnormalities, physical factors of workers, eye refraction abnormalities, lighting levels, work duration, close-up work, contrast, glare, and monitor screen display (Siagian *et al*., 2017; Simbolon and Lubis, 2017).

Based on the results of observations made on employees of the customer service department at PT X who use computers in their daily life, it was found that 80% of the workers experienced complaints of eye fatigue, including headaches and blurred vision, as many as 4% of people itchy, sore eyes as many as 3% of people, dizziness and nausea as many as 1% of people. Respondents said that eye fatigue complaints resulted in a decrease in work concentration, especially in inputting data. There could be errors in data input, so it became invalid and decreased work productivity, especially time in completing work reports. In addition, the company's costs have increased for purchasing glasses for customer service employees with poor vision at PT X. Based on this. It is necessary to conduct research on factors related to the incidence of eye fatigue in customer service employees at PT X in 2022.

MATERIAL AND METHOD

This research uses quantitative research by using a *cross-sectional* design. The independent variables in this study were age, gender, years of service, duration of computer use,distance to view the monitor screen, and the dependent variable was eye fatigue. In the parameters of this study, data collection was carried out through primary and secondary data collection using a questionnaire research instrument. The questionnaire used in the study contained five questions, including questions about age, gender, how long to work staring at the monitor screen in a day, whether to stare at the monitor screen comfortably and questions about some of the symptoms of eye fatigue experienced by respondents. Ethics review number 0922-02007/DPKE-KEP/FINAL-EA/UEU/II/2022. The population in this study were all employees of the customer service department at PT X, as many as 50 people. The sample in this study was the total population. The sampling technique in this study used a total sampling technique with univariate data analysis using the descriptive statistics test and bivariate data analysis using the *Chi-square* test. The degree of significance in this study was 0.05, related if the *p-value* < 0.50 and unrelated if the *p-value* > 0.05.

RESULT

The frequency and percentage distributions in each research variable with a description of the results as shown in Table 1. It is known that of the 50 customer service department employees at PT X. The highest proportion was obtained, namely, employees who experienced complaints of eye fatigue (88%), employees who were ≤40 years old (84%), females as many as (64%), working period >3 years (90%), the duration of computer use >8 hours (92%), the distance of viewing the monitor ≤50 cm (76%).

The results of the study in Table 2 show the results obtained in the age variable, namely the *p-value* = 1.000 with a value of α = 0.05 meaning that the value of p > 0.05. It can be concluded that there is no significant relationship between the age variable and eye fatigue in employees of the customer service department and employees aged ≤40 at risk of 1.007 times higher to experience eye fatigue compared to employees who are >40 years old.

It is known that the results obtained on the sex variable (Table 2) , namely the *p-value* of = 0.001 with a value of α = 0.05 meaning the value of p < 0.05. It can be concluded that there is a significant relationship between the sex variable and eye fatigue in customer service employees and Based on the results of PR obtained results (1 : 0.667 = 1.499) it can be concluded that employees who are female are 1.499 times more at risk of experiencing eye fatigue compared to employees who are male.

It is known that the results obtained in the service period variable (Table 2), namely the *p-value* = 0.487 with a value of α = 0.05 meaning the value of p > 0.05. It can be concluded that there is no significant relationship between the variables of service period and eye fatigue in customer service employees and based on the results of PR obtained results (1: 0.900 = 1.111) it can be concluded that employees who work >3 years are at risk of 1.111 times to experience eye fatigue compared to employees who work ≤3 years.

It is known that the results obtained in the computer use duration variable (Table 2), namely the *p-value* = 0.004 with a value of α = 0.05 meaning the value of p < 0.05. It can be concluded that there is a significant relationship between the variables of the duration of computer use and eye fatigue in customer service employees and based on the pr results obtained results (1 : 0.267 = 3.745) it can be concluded that employees who work with a duration of >8 hours are 3.745 times more likely to experience eye fatigue compared to employees who work with a duration of 8 hours per day.

It is known that the results obtained in the monitor viewing distance variable (Table 2), namely the *p-value* = 0.002 with a value of α = 0.05 meaning the value of p < 0.05. It can be concluded that there is a significant relationship between the variable distance of seeing the monitor and eye fatigue in employees of the customer service department and employees who see the monitor with a distance of ≤50 cm is 1.669 times higher to experience eye fatigue compared to employees looking at the monitor with a distance of >50 cm.

DISCUSSION

Overview of eye fatigue

Based on the results of a study that was conducted on 50 computer user workers in the customer service department at PT X in 2021. Table 1 shows the results of the study showed 44 respondents (88%) experienced eye fatigue, while those who did not experience eye fatigue were six respondents (12%). This study's results align with the results of a study conducted by Nourmayanti and Shofwati (2012) on computer user workers at C4 (Corporate Customer Care Center) PT. Telekomunikasi Indonesia Tbk, most workers experienced complaints of eye fatigue, namely (90.2%), while workers who did not experience complaints of eye fatigue as many as (9.8%) workers. The complaints experienced by workers were sore eyes (58.8%), pain around the eyes (43.1%), and headaches (43.1) (Nourmayanti and Shofwati, 2012). Although there have been many benefits obtained from using computers, not many have realized that using computers can also cause problems of its own, in the form of occupational diseases caused by using computers, especially if working with computers for a long time continuously (Anies, 2014).

Table 1. Distribution of eye fatigue frequency, age, gender, length of service, duration of computer use, distance of viewing monitors in employees of the customer service department at PT X in 2022

Variable	Frequency (N)	Percentage (%)	Total	Percentage (%)
Eye fatigue				
Experiencing complaints	44	88	50	100
No complaints	6	12		
Age				
≤40 years	42	84	50	100
>40 years	8	16		
Gender				
Male	18	36	50	100
Woman	32	64		
Service life				
≤3 years	5	10	50	100
>3 years	45	90		
Duration of use of the computer				
≤8 hours per day	4	8	50	100
>8 hours per day	46	92		
Monitor viewing distance				
Distance ≤50 cm	38	76	50	100
>Distance of 50 cm	12	24		

Table 2. Relationship of age, gender, length of service, duration of computer use, distance of viewing monitors against eye fatigue in employees of the customer service department at PT X in 2022

Independent variables	Category	Eye fatigue				Total		*p - value*	PR 95% CI
		With sign		Without sign					
		n	%	n	%	N	%		
Age	≤40 years	37	74	5	10	42	100	1.000	1.007 (0.757-1.338)
	>40 years	7	14	1	2	8	100		
Gender	Male	12	24	6	12	18	100	0.001	0.667 (0.481-0.924)
	Woman	32	64	0	0	32	100		
Service life	≤3 years	4	8	1	2	5	100	0.487	0.900 (0.574-1.412)
	>3 years	40	80	5	10	45	100		
Duration of computer use	≤8 hours per day	1	2	3	6	4	100	0.004	0.267 (0.0049-1.463)
	>8 hours per day	43	86	3	6	46	100		
Monitor viewing distance	Distance ≤50 cm	37	74	1	2	38	100	0.002	1.669 (1.032-2.700)
	>Distance of 50 cm	7	14	5	10	12	100		

Based on the research of Yuliana (2018), the era of technological development as it currently requires everyone to interact with computer devices. Generally, today the role of the computer is extensive. Many people spend their time in front of the computer for at least 3 hours a day. Without realizing it, working long hours in front of the computer can cause negative health problems, both physically and mentally, for the operator. Based on research conducted, the highest proportion of employees experiences eye fatigue. Excessive use of computers will increase the risk of work interruptions. One of them is eye health problems. Eye health disorders due to computer use occur because the eyes constantly look at the computer monitor (Ibrahim *et al*., 2018).

Symptoms of tired eyes can also spread to other parts of the body, such as pain in the shoulders, neck, and back and headaches. Some of these symptoms will be more pronounced if you are sleep deprived because enough sleep is essential for the eyes. During sleep, the eyes will also rest and get nutrients for tissue repair to overcome tired eyes. Lack of sleep is tantamount to reducing or disrupting the eye rest process (Indonesian Ministry of Health, 2018). Symptoms in the eyes and neck caused by excessive use of computers/monitor screens are blurry eyes, headaches, eye irritation, double vision, and red and dry eyes (Ministry of Health Regulation, 2019).

An overview of age

Based on the results of research conducted on 50 employees of the customer service department at PT X in 2021, the highest proportion is employees who are ≤40 years old with a proportion (84%). The results of this study are not in line with research conducted by Sunyanti (2019), which states that workers who are more than 30 years old experience complaints of eye fatigue as much as 81% (17 out of 21 workers). Age is significantly related to the power of accommodation. With age, the eye's lens will decrease its suppleness and gradually lose its elasticity. This causes a decrease in the ability of the lens of the eye to focus objects on the retina so that discomfort arises in the eyes and accelerates the occurrence of eye fatigue. The older a person is, the more the lens loses elasticity so that the accommodation power decreases, the muscles are more difficult to thicken and thin the eyes. Vice versa, the younger a person needs less light compared to older age and tends to experience less eye fatigue (Supriati, 2012).

The results of observations in the field are many computer users in employees of productive age, namely the age of 20-40 years, because in PT X, which is directly under the regional office and head office. The function of branch offices is a medium for achieving banking targets and operations to serve the community directly so that more workers of productive age of 20-40 years are placed in branch offices and more than 40 years old are placed in regional offices, head offices, and many are promoted. So more workers are 20-40 years old compared to workers who are more than 40 years old. In this case, the HSE PT X team has made an effort to create a periodic eye examination program carried out at least once every year because it is an essential part of eye care, vision, and overall health.

Based on research, it is recommended for eye examinations to be carried out more than once every year, at least once every three months, considering the workload of employees in this customer service section is more to computer users in the age range of 20-40 years. In addition, paintings and greenery can also be displayed around the workplace, which can ease the burden on the eyes and make employees' eyes relax for a moment.

Based on Rahayu (2017) stated that there is a relationship between age, distance, and lighting levels, with eye fatigue (Asthenopia). Based on the study's results, factors related to eye fatigue are age. The older a person age decreases the accommodation power of the eye to see objects, gender, and lighting factors that are not in accordance with the lighting threshold value in the workspace.

An overview of fender

Based on the results of research conducted on 50 employees of the customer service department at PT X in 2021, the highest proportion of employees is female gender with a proportion (64%) as shown in Table 1. This study's results align with research conducted by Rahman and Sanip, 2011. It was found that there were 60% of female respondents and 40% of male respondents. The results of the OR test analysis showed that women 0.0269 experienced higher complaints of eye fatigue compared to men, based on the theory proposed by Arianti (2016). Gender is a risk factor for eye fatigue, which is more common in workers of the female sex. As a person ages, the estrogen and antiandrogens in women will increase. Both hormones will suppress the secretion of tears so that the tear layer in women tends to be thinner than in men. This thinning of the tear layer results in the eyes tending to experience fatigue when using a computer.

The results of observations in the field of customer service respondents at PT X are dominated by women as shown in Table 1. This is because women are considered more thorough and patient to have direct contact with customers. In addition, customer service must explain some complicated procedures and provide solutions to customer problems ranging from inputting data on a computer, analyzing data on a computer, and providing solutions for customers. Therefore, PT X is more dominated by female workers. According to PT X PSDM data, the overall number of female workers from year to year increased continuously in 2018 by 14.467 female and 9.049 male workers. In 2019 there were 14.162 female workers and 9.049 male workers. As of December 2021, the number of workers was 14.280 female and 8.913 male workers. At PT X, in the branch where researchers are concerned, the number of female customer service workers is 32, while the men are 18.

Based on research, it is recommended that the division of work tasks can be considered again between employees of the male and female sexes. This is done so that the division of work tasks is more balanced workload so that female employees can be minimized the risk of eye fatigue. In addition, female workers can apply a momentary rest to the eyes to relieve fatigue.

Overview of working period

Based on the results of research conducted on 50 employees of the customer service department at PT X in 2021, the highest proportion is employees with a working period of >3 years with a proportion (of 90%) as shown in Table 1. This is in line with research conducted by Anggraini *et al*. (2013) obtained results from 78 respondents with a work period of more than three years experienced more complaints of eye fatigue (69.6%) compared to respondents who had a work period of fewer than three years (26.9%). The positive impact is that if the worker has a long working period, the worker has a lot of work experience. In contrast, the negative impact is the length of the worker's working period, the greater the risk of the worker experiencing occupational diseases, one of which is visual impairment, namely eye fatigue (Suma'mur, 2014).

Workers who have worked for more than three years have a higher risk of experiencing eye fatigue than workers who have worked for less than three years. Workers who have worked for more than three years have a higher risk of experiencing eye fatigue than workers who have worked for less than three years (Chandraswara, 2021). The results of observations in the field are still many employees who have worked for more than three years and are still serving in customer service at PT X. This is due to the COVID-19 pandemic, so the appointment of employees to move up to other positions needs to be improved. Based on research, it is recommended that the companies to be able to rotate work or transfer employees who have worked for more than three years to other parts with less computer use or raise positions for employees who have worked for more than three years to minimize the risk of eye fatigue.

Overview of the duration of computer use

Based on the results of research that has been carried out on 50 employees of the customer service department at PT X in 2021, the highest proportion is employees who use computers >8 hours per day with a proportion (92%) as shown in Table 1, while the lowest proportion is employees who use computers £8 hours per day with a proportion (8%). This is in line with previous research conducted by Fradisha *et al.* (2017) found that from 63 study samples, 29 employees who worked with a duration of >4 hours experienced complaints of eye fatigue compared to 34 employees who did not experience eye fatigue due to working with a mild duration of <2 hours.

According to the National Institute of Occupational Safety and Health, eye fatigue affects about 90% of people who spend three or more hours per day in front of a computer. When a user focuses their gaze on the screen for an extended period, the small muscles in their eyes will continue to contract, resulting in fatigue, blurring vision, and difficulty focusing the mind (Fradisha *et al*., 2017). The results of observations in the field of many workers who use computers >8 hours higher than workers who use computers ≤8 hours a day because workers must complete work on time and achieve targets for the targets of each division are different, such as in the customer service section must do maintained

customer data and at the end of each month must be complete. There must be no missing data, so for today's work must be completed today too, then many workers do overtime. In the current digitalization era, the customer service at PT X is divided into two parts: the Customer Service Officer counter (CSO) and the Customer Xperience Officer (CXO).

The main task of a CSO is to help carry out the process of opening an account, changing cards, inputting new customer data, inputting customer complaints, and updating customer data, all of which work is done using a computer so that a CSO must stare at the monitor screen for more than 8 hours per day. In contrast to the CSO, the main task of a CXO uses less of a computer screen in his daily life. The duties of a CXO are to help customers introduce digital machines, help change atm cards via e-Service machines, help print passbooks and replace passbooks through e-Service machines, and help open accounts via online self-service. The use of computers by employees who serve as CXOs is less than that of employees who serve as CS counters. In the future, PT X will increase the number of e-Service and self-service machines, considering that digital development has been very rapid and many banks have implemented digitalization using machines. However, for now, many customer service jobs must be done using human labor by inputting on computers because there are not evenly distributed customers who understand technological advances.

Based on research, it is recommended that the HSE team to set a policy regarding the maximum overtime hours so that employees of the CSO department do not use computers for too long after a day of work and also evaluate each division target so that the work charged by the customer service department it's not too heavy to constantly stare at the monitor screen for a long day of work. In addition, socialization can also be done to customers who need help understanding the use of technology to understand better and understand using the available machine machines so that the duties of the CSO are lighter thanks to the help of machines.

Overview of the distance of staring at the monitor screen

Based on the results of research that has been conducted on 50 employees of the customer service department at PT X in 2021, the highest proportion was obtained by employees who saw a monitor with a distance of ≤50 cm with a proportion (76%) as shown in Table 1, while the lowest proportion was employees who looked at the monitor distance with a distance of >50 cm with a proportion (24%). This is in line with research conducted by Salote *et al*. (2020) obtained the results of the majority of respondents (96%) using computers with a distance of <50 cm and experiencing complaints of eye fatigue.

Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 48 of 2016 concerning Office Occupational Safety and Health Standards, the layout of office equipment must meet the provisions so that workers feel comfortable and safe, namely adjusting the seat height to the height of the monitor so that the distance between the eyes and the monitor is 20- 40 inches or about 50- 100 cm and an angle of 15-20 degrees below the horizontal (Ministry of Health Regulation, 2016).

Based on research, employees at PT X are used to using computers with a distance of ≤50 cm and there has been no effort made by the HSE team at PT X to reduce the high number of computer users with a distance of <50 cm. Based on research, it is recommended that the HSE Team to provide education about the safe space of computer use by avoiding staring at computer screens at close range (>50 cm) or for a long time to all employees of the customer service department so that eye fatigue can be minimized the risk. The optimal focal distance for the eye to see an object is approximately 20-60 inches (50-66 cm). At that distance, normal vision, either from normal eyes or those assisted by glasses, will be most comfortable.

Analysis of age with eye fatigue in employees of the customer service department at PT X in 2021

The results of this study are not in line with the research conducted by Sunyanti (2019), which states there is a significant relationship between age and complaints of eye fatigue. Generally, by the time humans are 20 years old, humans can see objects clearly, while at the age of 45, the need for light is four times greater. Then after turning 60 years old, the need for light required to see is much greater than that of 45 years old because, at the age of 45-50 years, the accommodation power of the eyes becomes reduced. The prevalence of eye fatigue is 25-30% at the age of 40. Meanwhile, late adult onset is found at more than 40 years, less often than early adult-onset (Siagian *et al*., 2017).

In this study, many computer users in employees of productive age, namely the age of 20 - 40 years, because at PT X, which is directly under the regional office and head office. The function of the branch office is a medium for achieving banking targets and operations for direct service to the community so that more workers of productive age 20-40 years are placed in branch offices and more than 40 years old are placed in regional offices and head offices, many are promoted to positions. Based on research, it is recommended to do regular eye exams not only once every year, for example, with the category of examinations once every three months for workers aged 20-40 years, considering that most of the workers who are given a heavy workload are aged 20-40 years. In addition, the company can also install a screen protector on each employee of the customer service department.

Analysis of gender with eye fatigue in customer service employees at PT X in 2021

Based on the results of research conducted, 64% of female employees experience eye fatigue, while 24% of male employees experience eye fatigue as shown in Table 2. Based on the *Fisher's Exact Test* statistical test that the *p-value* = 0.001 with a value of α = 0.05 means that the value of p < 0.05, it can be concluded that there is a significant relationship between the sex variable and eye fatigue in customer service employees.

The results of Rahman and Sanip's (2011) study state that women are more at risk of experiencing eye fatigue than men, and there is a significant relationship between sex and complaints of eye fatigue. Women are more susceptible to disease and have higher levels of stress. Women tend to be more thorough and painstaking at work, so they will properly focus on the job at hand to reduce the rate of work error. The demand to be able to focus attention in front of the computer continuously becomes an influential source in the psychological as well as the vision. This will indirectly irritate the eyes quickly and trigger discomfort and eventually cause visual impairment (Arianti, 2016).

The results of observations in the field of the female sex are related to eye fatigue. This is because, at PT X, many customer service employees are dominated by women. At PT X in the branch, researchers are concerned the number of female customer service workers is 32, while the men are 18 (Table 2). The number of female workers is more in PT X because customer service requires the accuracy, patience, and determination generally owned by the female sex. Therefore, more workers are female compared to workers who are male.

Based on the research, it is recommended that the HSE team to educate about the importance of eye rest and evaluate the division of work tasks between male and female workers to be more balanced so that complaints of eye fatigue can be minimized.

Analysis of the duration of work with eye fatigue in customer service employees at PT X in 2021

Based on the results of research conducted that employees who work >3 years (80%) experience eye fatigue while employees who work ≤3 years (8%) experience eye fatigue as shown in Table 2. Based on the *Fisher's Exact Test* statistical test that the *p-value* = 0.487 with a value of α = 0.05 means that the value of p > 0.05, it can be concluded that there is no significant relationship between the variables of service life and eye fatigue in customer employees.

The results of this study are not in line with Anggriani's (2013) research, which states that there is a meaningful relationship between a work period and complaints of eye fatigue. This is because workers working for a long time will have a greater risk of eye fatigue. After all, they are exposed to risk factors longer and stare at computer monitor screens continuously every day for more than three years.

The results of observations in the research field are separate because employees who have worked for more than three years more work are related to direct customers compared to staring at the monitor screen all day long. The length of work factor does not show a meaningful relationship with complaints of eye fatigue. It can occur due to other factors such as work patterns, namely the duration of seeing small work objects for an extended period without preventive efforts such as blinking eyes or 20-20-20 so that the water that wets the eyes evaporate and there is an event of complaints of eye fatigue. Based on research, it is recommended that the companies to rotate their work every few years from customer service workers to other parts with less computer use so that eye fatigue can be resolved.

Analysis of the relationship between the duration of computer use and eye fatigue in customer service employees at PT X in 2021

Based on the results of research conducted, employees whose computer use duration is more than 8 hours per day 86% experience eye fatigue, while employees whose duration of computer use is 8 hours per day 2% do not experience eye fatigue as shown in Table 2. Based on the *Fisher's Exact Test Statistical Test* that the *p-value* = 0.004 with a value of = 0.05, meaning that the p < 0.05, it can be concluded that there is a significant relationship between the variable duration of computer use and eye fatigue in customer service employees.

This study's results align with research conducted by Fradisha *et al*. (2017), which states that there is a significant relationship between the duration of computer use and eye fatigue in Bank Sinarmas Jakarta employees. Eye fatigue can appear immediately after using the computer for a long time or more than 4 hours. The results of observations in the customer service field are that employees spend more time using computers in their daily work activities. Employees can use the computer for more than 8 hours per day and sometimes even more because there is work that has not been completed on that day and must be completed by increasing the working hours, which will automatically increase the time to stare at the monitor screen for workers, at PT X has two types of CSO and CXO. CSO employees tend to stare at the monitor screen more in each data entry compared to CXO employees, who, in their daily activities, are more focused on maximizing the use of e-Service machines and rarely looking at computer screens. However, the number of CXO employees at PT X is still limited. This is because the machines used at the branch are not too many and the customers who come still need to understand the technology entirely.

Based on research, it is recommended that the HSE team educate employees on where the duration of computer use can increase the prevalence and severity of eye fatigue. In addition, it is recommended

for employees of the customer service department to pay attention to their rest time between computer use, for example, by resting their eyes every time. Thirty minutes or see the green color that can relax the eyes. As for CXO employees, they maximize themselves in introducing digital machines to customers who come so that customers understand more about the use of digital devices and the duration of computer use at CSO can be minimized.

Analysis of the relationship between distance staring at the monitor screen with eye fatigue in customer service employees at PT X in 2021

Based on the results of research conducted, employees who look at the monitor at a distance of 50 cm, 74%, experience eye fatigue, while for employees who view it at a distance of more than 50 cm, 14% experience eye fatigue. Based on the *Fisher's Exact Test* statistical test that the *p-value* = 0.002 with a value of = 0.05, meaning the p < 0.05, it can be concluded that there is a significant relationship between the variable distance to see the monitor and eye fatigue in the customer service employees.

The results of the study are in line with the research conducted by Salote *et al*. (2020), it was found that there was a significant relationship between monitor distance and eye fatigue. Visual comfort and good posture depend on the distance between the monitor screen and the eyes. To be able to work using a computer, the distance between the eyes and the computer screen is at least 50 cm. the most ideal and optimal focal distance for the eye to see an object is approximately 20-60 inches (50-66 cm), at that normal distance vision, either from normal eyes or those assisted by glasses, will be at the most comfortable point (Fadhillah, 2013).

Eye fatigue can appear immediately after using the computer for a long time or more than 4 hours. Various symptoms that arise in computer workers who work for a long time are not only caused by light entering the eyes but also because the eyes of a computer worker blink less than ordinary workers, causing the eyes to become dry and feel hot (Maryamah, 2011). If the lighting intensity is not enough, it can cause visibility disturbances and screen fatigue, while if the lighting intensity is too high, it will cause visibility disturbances, glare, eyestrain, reflections, and excessive shadows (Tarwaka, 2015). The results of field observations are still many employees who use computers with a distance of less than 50 cm. Employees are accustomed to staring at computer screens at close range daily. Employees feel more comfortable using computers nearby than long distances. In addition, some workers have complaints such as minus eyes, so they have to stare at the computer screen at close range.

Based on the research, it is recommended that the HSE team to modify the computer by installing an anti-radiation screen protector on each employee's computer monitor, setting the computer location where the eye position is at the same level as the top of the monitor screen, and providing education about the safe distance to use the computer with avoiding staring at the computer screen at close distances (>50 cm) or for a long time, in addition to being able to make settings on the computer screen so that the writing is not too small to be seen by everyday workers.

CONCLUSION

The highest proportion, namely in employees of the customer service department who experience complaints of eye fatigue, employees aged ≤40 years, employees who have a female gender, employees who have a working period of >3 years, employees who have a computer usage duration of >8 hours per day, and employees who are distanced from looking at the monitor ≤50 cm. The bivariate analysis results show no significant relationship between the variables of age, length of service, and eye fatigue in employees of the customer service department at PT X in 2022. There is a significant relationship between gender variables, computer use duration, and the distance of looking at the monitor with eye fatigue in the customer service department employees at PT X in 2022.

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REFERENCE

Anggraini, Y., Fitriangga, A., Fitrianingrum, I., 2013. Faktor-Faktor yang Berhubungan dengan Terjadinya Keluhan Computer Vision Syndrome (CVS) pada Operator Komputer PT. Bank Kalbar Kantor Pusat Tahun 2012. J. Mhs. PSPD FK Univ. Tanjungpura Vol. 3(1), Pp. 1-17.

Anies, A., 2014. Berbagai Penyakit akibat Kerja dan Upaya Penanggulangan dari Aspek Kedokteran. In: Kedokteran Okupasi. Ar-Ruzz Media, p. Pp. 232.

Ansorge, R., 2014. Eye Fatigue. Eye Fatigue: Causes, Symptoms, and Treatment. WebMD. URL http://www.webmd.com/eye-health/eye-fatigue-causes-symptoms-treatment (accessed 10.20.22).

Arianti, F.P., 2016. Faktor-Faktor yang Berpengaruh dengan Keluhan Kelelahan Mata pada Pekerja Pengguna Komputer di Call Center PT.AM Tahun 2016. Universitas Islam Negeri Syaraif Hidayatullah Jakarta.

Chandraswara, B.N., 2021. Hubungan antara Usia, Jarak Penglihatan dan Masa Kerja dengan Keluhan Kelelahan Mata pada Pembatik di Industri Batik Tulis Srikuncoro Dusun Giriloyo Kabupaten Bantul. Promot. J. Kesehat. Masy. Vol. 11(1), Pp. 1-10.

Dewi, Y.K., Sitorus, R.J., Hasyim, H., 2010. Faktor-Faktor yang Berhubungan dengan Kelelahan Mata pada Operator Komputer di Kantor SAMSAT Palembang. J. Ilmu Kesehat. Masy. Vol. 1(1), Pp. 38-42.

Fadhillah, S.L., 2013. Faktor-Faktor yang Berhubungan dengan Keluhan Kelelahan Mata pada Pengguna Komputer di Accounting Group PT Bank X Jakarta Tahun 2013.

Firdani, F., 2020. Faktor yang Berhubungan dengan Keluhan Kelelahan Mata pada Pekerja Operator Komputer. J. Endur. Vol. 5(1), Pp. 64-70.

Fradisha, M., Wulandari, R.A.S., Sari, A.A.A., 2017. Hubungan Durasi Penggunaan Komputer dengan Computer Vision Syndrome pada Karyawan Bank Sinarmas Jakarta. Nexus Kedokt. Komunitas Vol. 6(1), Pp. 50-61.

Ibrahim, H., Basri, S., Jastam, M.S., Kurnianda, I., 2018. Faktor-Faktor yang Berhubungan dengan Keluhan Computer Vision Syndrom pada Pekerja Operator Komputer di PT. Semen Tonasa Pangkep. Al-Sihah Public Heal. Sci. J. Vol. 10(1), Pp. 85-95.

Indonesian Ministry of Health, 2018. Info Datin Situasi Gangguan Penglihatan.

Maryamah, 2011. Faktor- Faktor yang Berhubungan dengan Kelelahan Mata pada Pengguna Komputer di Bagian Outbound Call Grha Telkom BSD (Bumi Serpong Damai) Tahun 2011. Universitas Islam Negeri Syarif Hidayatullah.

Ministry of Health Regulation, 2016. Permenkes RI No. 48 Tahun 2016 tentang Standar Keselamatan dan Kesehatan Kerja Perkantoran.

Ministry of Health Regulation, 2019. Apa itu Computer Vision Syndrome (CVS)?

Nourmayanti, D., Shofwati, I., 2012. Faktor-Faktor yang Berhubungan dengan Keluhan Kelelahan Mata pada Pekerja Pengguna Komputer di Corporate Customer Care Center C4 PT Telekomunikasi Indonesia Tahun 2009. UIN Syarif Hidayatullah.

Rahayu, S., K, S.B., 2017. Kelelahan Mata (Asthenopia) Pada Pekerja Pengguna Komputer di PT. PLN APP di Cirebon. Afiasi J. Kesehat. Masy. Vol 2(3), Pp. 89–96.

Rahman, Z.A., Sanip, S., 2011. Computer User: Demographic and Computer Related Factors that Predispose User to Get Computer Vision Syndrome. Int. J. Business, Humanit. Technol. Vol. 1(2), Pp. 84-91.

Salote, A., Jusuf, H., Amalia, L., 2020. Hubungan Lama Paparan dan Jarak Monitor dengan Gangguan Kelelahan Mata Pada Pengguna Komputer. Gorontalo J. Heal. Sci. Community Vol. 4(2), Pp. 104-121.

Siagian, I.B., Tarigan, L., Syahri, I.M., 2017. Faktor-Faktor yang Berhubungan dengan Kelelahan Mata pada Personal Computer PT. Deltamas Medan Tahun 2017. Universitas Sumatera Utara.

Simbolon, R.V., Lubis, H.S., 2017. Hubungan Intensitas Pencahayaan dan Lama Paparan Radiasi Monitor Komputer dengan Keluhan Kelelahan Mata pada Pekerja Pengguna Komputer di Kantor inas Pendidikan Provinsi Sumatera Utara Tahun 2016. Universitas Sumatera Utara.

Suma'mur, 2014. Higiene Perusahaan dan Kesehatan Kerja (Hiperkes). Sagung Seto, Jakarta.

Sunyanti, S., 2019. Keluhan Kelelahan Mata pada Pekerja Pengguna Komputer di Perusahaan Travel di Kolaka Raya. IDENTIFIKASI Vol. 5(2), Pp. 168-177.

Supriati, F., 2012. Faktor-Faktor yang Berkaitan dengan Kelelahan Mata pada Karyawan Bagian Administrasi di PT. Indonesia Power UBP Semarang. J. Kesehat. Masy. Univ. Diponegoro Vol. 1(2), Pp. 1-11.

Tarwaka, 2015. Dasar-Dasar Keselamatan Kerja Serta Pencegahan Kecelakaan di Tempat Kerja, 1 st. ed. Harapan Press Surakarta.

Yuliana, L., 2018. Faktor-Faktor yang Mempengaruhi Kelelahan Mata Mahasiswa Gedung G Universitas Balikpapan. IDENTIFIKASI Vol. 4(2), Pp. 28-42.