International Journal of Manufacturing Economics and Management
ISSN 2784-1278 ISSN-L 2784-1278, Vol. IV, No. 1 / 2024
https://doi.org/10.54684/ijmem.2024.4.1.15

INDUSTRIAL ERGONOMICS: EXAMINING ERGONOMIC PRACTICES AND COMPUTER VISION SYNDROME (CVS)

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Abstract: Computers have become a major component in daily life, especially in the context of higher education in this digital age. University lecturers increasingly rely on computers to perform various daily tasks, which is a trend that has intensified particularly in the wake of the Covid-19 pandemic. The growing dependence on computers raises concerns about the negative health implications that may arise from long-term use. One of the main effects is Computer Vision Syndrome (CSV). CSV is a result of continuous computer use and can have a negative impact on eye health. One strategy to address this issue is to implement ergonomic principles when using computers. This study aims to investigate ergonomic practices among university lecturers, as well as the prevalence of CSV among them. In addition, this study aims to determine the relationship between CVS and ergonomics. This study involves data collection through questionnaires which the respondents are university lecturers in Malaysia. A total of 245 randomly selected respondents answered the questionnaire distributed through an online platform. The data obtained was analyzed using descriptive and Chi Square analysis, exploring ergonomic practices such as eye distance from the screen, viewing angle, keyboard position, light intensity, position of neck, head, wrist, thigh position and stretching practices. According to the study's findings, over 56% of lecturers incorporate ergonomic principles when using computers; nevertheless, only 38.4% of respondents adhere to the recommendation for keyboard viewing distance. Next, the CVS symptoms are categorized into three, namely eyes, vision and head, neck, and shoulders. A comparison between these three categories of symptoms showed that the head, neck, and shoulders symptoms were the most significant with 42.1% of the respondents showing moderate and severe symptoms. It is followed by vision and finally symptoms to the eyes, with the percentage of 22.9% and 19.6%, respectively. In addition, it was found that one vision symptom is associated to monitor distance ($p < 0.05$). The findings from this research contributed valuable insights into understanding the occupational risks associated with prolonged computer use in academic settings. By raising awareness and potentially implementing preventative measures, this study helps to promote better well-being among university lecturers.
Key words: Computer Vision Syndrome (CVS), lecturer, ergonomic, eye, vision, symptoms.

1. INTRODUCTION

Computers are becoming a necessary component of daily life in the digital age, especially in educational settings, by supporting the pedagogical use of information and communications technologies (ICT). Particularly, university lecturers rely significantly on technology for a variety of responsibilities, including creating lectures, conducting research, and interacting with students. On the other hand, this growing reliance on computers has raised concerns regarding the potential negative health implications of long-term computer use, including the emergence of Computer Vison Syndrome (CVS). CVS, commonly referred to as digital eye strain, is brought on by continuous, long-term computer use. According to researchers, there are 60 million cases of CVS worldwide [1]. 5% to 65% of the adult population in the USA had CVS prior to the COVID-19 epidemic [2]. During the pandemic, more people are relying on digital devices to work and socialize. Consequently, the percentage of people suffering from computer vision syndrome increased to 78% [1].

A significant component in improving the health, safety, and wellbeing of computer users is ergonomics, a multidisciplinary science that focuses on designing and organizing workspaces to meet the capabilities and constraints of the human body. To reduce the risk of CVS and other health-related problems, ergonomic knowledge and practices consider a variety of elements, including workstation arrangement, good posture, suitable lighting, and regular breaks. Furthermore, the value of ergonomic knowledge and practices cannot be understated because they are essential in reducing the risk of musculoskeletal illnesses and other health problems among computer users [3,4].

Maintaining health and safety when using a computer requires careful consideration of ergonomics. Many health effects associated with prolonged computer use were reported, such as wrist-ache, back-ache, neck pain, headache, eye strain etc. Therefore, it is crucial to comprehend the prevalence of CVS and the level of ergonomic knowledge and usage among university lecturers. Many studies have been carried out to see the prevalence of CVS among university staff and students [4,5]. In Malaysia, many studies are more focused on ergonomic issues [6,7,8]. There are only a few studies related to CVS among university staff and students in Malaysia. The research that has been carried out is focused only on administrative or office workers [9,10] or students [11]. Moreover, the study was conducted before the COVID-19 pandemic.

1.1. Computer Vision Syndrome

Computer vision syndrome, also referred to as digital eye strain, describes a group of eye- and vision-related problems that result from prolonged usage of visual display terminals (VDTs) such as computers, tablets, smart phones, e-reader etc. The use of this equipment for more than 3 hours a day at less than 6 meters is a factor that causes CVS among individuals [12]. With the growing importance of digital devices in our daily lives, CVS is now becoming increasingly common. This illness may strike people of various ages and occupations, including office workers, gamers, students and lecturers.

The constant focusing and refocusing required to view a digital screen for an extended period causes eye strain and tiredness. Focusing on the screen requires more effort from the eyes, especially when the text is small, or the contrast is low. Screen characteristics may be a factor in CVS symptoms. It might be difficult to comfortably view content on screens with low screen resolution, pixelation, or flashing since these conditions strain the eyes. An additional factor that might lead to pain and eye strain is excessive glare from the screen or nearby lighting sources. The signs of CVS might vary among individuals, but there are commonly involve vision strain—burning, redness, dryness, and discomfort in the eyes, vision blurring—varying or hazy vision, which makes it challenging to focus, headaches— from the forehead or temples, neck and shoulder pain as well as sleep issues and fatigue [13]. CVS symptoms initially simply develop discomfort, but if left untreated, it may cause an effect on work efficiency. CVS can obstruct daily tasks, lower productivity, increase the rate of work errors, and eventually lead to a reduction in service satisfaction [13]. Therefore, it is very important for individuals who use a lot of VDTs to be aware of CVS and take appropriate measures to reduce the effects of CVS.

1.2. Ergonomics in Computer Vision Syndrome

It has been demonstrated that using a VDT during routine office tasks increases the prevalence of some eye-related symptoms, which are further influenced by individual and ergonomic considerations. Individuals who do not practice ergonomic principles, check their posture, and make ergonomic changes are at higher risk of getting CVS [14]. People can reduce the effects of CVS, maintain comfortable and effective computer usage, and protect their long-term eye health by being aware of the potential risks and implementing healthy screen habits into practice. Several studies show that ergonomic practices are important in reducing the effects of CVS [10,14,15]. Chi-Square tests were used in these studies to determine the association. CVS can worsen if proper ergonomics is not practiced, such as when people sit too close to screens or handle their devices at awkward angles. CVS can be exacerbated by poor ergonomic computer usage techniques. The eyes can become tired and uncomfortable due to unsuitable viewing distances, incorrect monitor heights, and poor lighting. Musculoskeletal problems, such as neck and shoulder pain, can be brought on by inadequate support for the neck, shoulders, and back, poor posture, and prolonged use of digital gadgets [16,17].

With the increasing use of computers among lecturers, the study of CVS amongst them is very important. Therefore, the aim of this study is to measure the prevalence of CVS among university lecturers and to determine the level of ergonomic practices in computer usage among university lecturers. Next, this study is also to quantify the association between the level of ergonomic practices and the prevalence of CVS among university lecturers. CVS is expected to be associated with ergonomic practices, where poor ergonomic practices will cause CVS. This study is important for evaluating the prevalence of CVS and the awareness and implementation of ergonomics among university lecturers. The findings of this study also can be beneficial to assist future ergonomic guideline development especially for university lecturers.

2. METHODOLOGY

This research is a cross-sectional design study. Approval was obtained from the unversity ethics committee (Reference number: JKEUPM-2022-668). A questionnaire set is utilized to measure level of ergonomics practice during computer usage and prevalence of computer vision syndrome (CVS) among university lecturers

in Malaysia. The questionnaires were adapted from several similar studies [3,4,13,18,19,20]. The questionnaire is divided into three sections, namely A, B, and C. Section A is to collect respondent demographics info, meanwhile Section B, and C, are to measure prevalence of CVS symptoms and ergonomics practice, respectively. For section respondent personal details, information such as gender, age, educational background, year of work, and computer usage period are collected. For the prevalence of CVS among lecturers, a rating scale is used to evaluate CVS symptoms. There are four scales, namely: no symptom, mild – where a transient symptom persists for few minutes to hours, moderate - where symptoms persist for few hours and after rest or sleep, and severe - where medical attention is needed.

The CVS symptoms are divided into three categories, namely symptom on eye, vision and head, neck, and shoulder. Table 1 shows how the questionnaire items of Section B are categorized. Meanwhile for the ergonomics practice section in Section C, closed-ended questions are used, where respondents need to choose one answer for each question. Table 2 shows categories of the items in Section C.

Table 1. Categories in Section B of questionnaires

Label	Category	Section B item
B-A	Symptom on eye	•B1: Burning eye •B2: Itching eye •B3: Tearing eye •B4: Excessive eye blinking •B5: Eye redness •B6: Eye pain •B7: Heavy eyelids •B8: Dry eye •B9: Tired eye •B13: Sensitive to light
B-B	Symptom on vision	•B10: Blurred vision •B11: Double vision •B12: Difficult focusing •B14: Colored halos •B15: Sight worsening
B-C	Symptom of head, neck, and shoulder	•B16: Headache •B17: Neck & shoulder pain

Table 2. Categories in Section C of questionnaires

Label	Category	Section C item
C-A	Monitor distance	C1, C2 & C3
C-B	Viewing angle	C4, C5 & C6
C-C	Keyboard viewing	C7
C-D	Keyboard position	C8
C-E	Light intensity	C9
C-F	Neck posture	C10
C-G	Head position	C11
C-H	Hand & wrist	C12
C-I	Thigh	C13
C-J	Laptop on thigh	C14
C-K	Stretching	C15

2.1. Respondents

Respondents of this study is lecturers in several universities in Malaysia. The selection criteria for the respondents are gender, where both male and female lecturers are included in the study. The goal is to have a representative sample that encompasses lecturers from different genders. Also, familiarity with computer or VDT workstation setup is also needed. This criterion ensures that the respondents have knowledge and

experience working with computers or VDT in their teaching or administrative tasks. Another requirement is working with a computer or VDT for more than 10% of working time. This criterion ensures that the respondents regularly engage in tasks that involve computer or VDT usage, increasing the relevance of the study to their daily work. Exclusion criteria for respondents in this study is retired lecturers. Retiring age in Malaysia is at 60 years old. There is also the possibility of early retirement. In this study, lecturers who are retired or aged more than 60 years are excluded as respondents. The sample size for this study is 245. Random sampling was used to select 245 respondents among lecturers.

2.2. Data Analysis

In this study, IBM Statistical Package for the Social Sciences (SPSS) version 29 is used in the data analysis. The dataset is analyzed using statistical methods. A descriptive statistic is used to understand the central tendency, variability, and distribution of the CVS prevalence and ergonomic practices with the help of measurements like means, standard deviations, and proportions. In addition, a Chi-Square test was conducted to establish the relationship between ergonomic practice and CVS prevalence.

3. RESULTS AND DISCUSSION

The demographic factors examined in this study are gender, age, educational background, number of years working with computers or VDT, daily computer use, scheduled breaks while working with computers and wearing glasses. Table 3 shows frequency of respondents according to these items.

Table 3. Frequency of respondents according to gender, age, educational background, and experience with computer or VDT

Item	Category	Frequency	Percentage (%)
Gender	Male	66	26.9
	Female	179	73.1
Age	Below 30 years	3	1.2
	30 – 39 years	95	38.8
	40 – 49 years	98	40.0
	50 years and above	49	20.0
Educational background	Master	70	28.6
	PhD	175	71.4
Experience working with computer or any visual display terminal (VDT) at work	Less than 1 year	1	0.4
	1 – 5 years	16	6.5
	6 – 10 years	30	12.2
	11 – 20 years	107	43.7
	More than 20 years	91	37.1
Daily computer usage	Less than 1 hour	0	0
	1 – 3 hours	15	6.1
	4 – 6 hours	118	48.2
	More than 7 hours	112	45.7
Scheduled break	No	95	38.8
	Yes	150	61.2
Wearing spectacle	No	77	31.4
	Yes	168	68.6

From 245 respondents, only 66 of them are male and 179 respondents are female. This makes the percentage of male respondents only 26.9% compared to 73.1% female respondents. Female respondents are more than male, reflecting the population of lecturers in Malaysia where there are more female lecturers than male. The respondent's distribution across different age groups shows a diverse spectrum. The age range below 30 years represents 1.2% of the respondents, while those aged between 30 – 39 years obtained 38.8% of the respondent group. Lecturers aged between 40 – 49 years old represent the highest number, which is 40% of the respondents. Finally, the group of lecturers aged 50 and over represents 20% of the respondents.

70 of total respondents are Master holders, which contributes 28.6% of the total respondents. Meanwhile, the majority of the respondents, that is 175 or 71.4% are PhD holders. As for number of years working with computer or VDT, respondents who are less than 1 year working with VDT bring a value of 0.4%, where this is the smallest value. While the 1–5-years range is as much as 6.5% and represents 16 respondents. A total of 30 respondents for the range of 6-10 years working with VDT, and the highest respondents is in group range 11-20 years which represents 107 respondents with a percentage of 43%. For the category of more than 20 years, there are 91 respondents and represent 37.7%. This number of years working with computer or VDT distribution reflects a range of experiences and potential differences in technology use and adaptation.

The data collected from 245 respondent's reveals intriguing patterns in computer usage duration among university lecturers. A substantial majority, 93.9% of respondents spend more than three hours per day on their computers, while the remaining 6.1% only spend 1-3 hours daily working with computers. The breakdown indicates that 48.2% limit their usage to 4-6 hours, while another 45.7% surpass seven hours daily working with computer. The survey also shows that 150 of the respondents, which contribute 61.2% practice schedule breaks during computer or VDT work. Meanwhile, 38.8% of the total respondents do not practice the scheduled break. Regarding spectacles, 168 individuals, or 68.6% of the respondents, reported wearing glasses. In the meantime, 31.4% did not use spectacles.

3.1. Ergonomic Practice

Table 4 shows the frequency and percentage for monitor distance, viewing angle, keyboard viewing distance, keyboard position, and light intensity. Monitor distance score resulting from the addition of three monitor distance items in the questionnaire, that is C1, C2 and C3. The total score is divided into three categories namely less than normal, normal and over limit. Scores of 0 and 1 represent less than normal, score of 2 to 4 represents normal and score 5 and 6 represents over limit. As depicted on the Table 4, 11.8% of respondents look at computer screens at less than normal range, meanwhile 8.2% of respondents view their screen too far from their eye. However, the majority of respondents, which is at 80% maintain the correct distance from eye to the screen.

Table 4. Frequency and percentage of ergonomic categories

Ergonomic category	**Frequency (%)**		
	Less than normal	**Normal**	**Over limit**
Monitor distance	29 (11.8%)	196 (80%)	20 (8.2%)
Viewing angle	71 (29%)	156 (63.7%)	18 (7.3%)
Keyboard viewing distance	125 (51%)	94 (38.4%)	26 (10.6%)
Keyboard position	59 (24.1%)	139 (56.7%)	47 (19.2%)
Light intensity	24 (9.8%)	198 (80.8%)	23 (9.4%)

Another ergonomic category is viewing angle between eye to computer screen. Three items namely C4-angle eye to top screen, C5-angle eye to center of screen, and C6-angle eye to bottom of screen, assessed the respondents viewing angle. The results show that more than 50% of the respondents see the monitor at a right angle. Similar with monitor distance, the total score of viewing angle is calculated and divided into three categories namely less than normal, normal and over limit. The data shows that 63.7% respondents view their monitor at correct viewing angle, meanwhile 29% of respondents view their monitor at less than normal angle range. The remaining 7.3% of respondents exceed the limit of maximum viewing angle. A total of 36.3% of respondents do not practice correct viewing angle, where this amount can be considered quite large.

The next ergonomic category is keyboard viewing distance, which is assessed by C7. Keyboard distance less than 63 cm from eye is considered less than normal, and more than 82 cm from eye is considered over limit. The normal distance between keyboard and eye is between 63 cm – 82 cm. The data shows that majority of the respondents with 51% has a very close distance to the keyboard. Only 38.4% of the respondents maintain the correct distance between eye and keyboard. Meanwhile, 10.6% respondents eye position too far from the keyboard. Another ergonomic category related to keyboard and its position from the floor with sitting position, where less than normal is when the keyboard is less than 60 cm from the floor, normal position is between 60 cm – 82 cm from the floor and over limit is more than 82 cm from the floor. The data shows that 56.7% of the respondents use the correct keyboard position. Meanwhile, 24.1% of the respondents put their keyboard too close to the floor, and 19.2% of respondents put their keyboard too height from the floor.

Another ergonomic category considered in this study is light intensity. Correct light intensity is crucial for the eye especially when working long hours in front of a computer screen. Light intensity also is divided into 3 categories namely less than normal, normal and over limit. Light intensity of less than 200 lux is considered as

less than normal, 200 – 500 lux is considered normal, and more than 500 lux is considered over limit. As shown in Table 4, 80.8% of the respondents work in the normal light intensity, while only 9.8% and 9.4% of respondents work in very low light and very bright ambient, respectively.

Other ergonomic categories included in this study are neck posture, head position, stretching, position of hand & wrist, thigh and working with laptop on thigh. Table 5 depicted frequency analysis for these categories. According to Table 5, 167 out of 245 respondents, or 68.2% of the total, reported having the proper posture, which involves slightly bending their necks. This represents the majority of respondents when it comes to neck posture. Furthermore, 73 respondents, or 29.8% of the sample, exhibited a forward-leaning neck posture, whereas 5 respondents, or 2.0% of the sample, reported a backward-leaning neck posture.

Table 5. Frequency and percentage of neck posture, head position, stretching, hand & wrist position, thigh position and laptop on thigh

Item	Category	Frequency	Percentage (%)
Neck posture	Correct posture	167	68.2
	Neck forward	73	29.8
	Neck backward	5	2.0
Head position	Straight	173	70.6
	To the right	3	1.2
	To the left	4	1.6
	More than 1 position	65	26.5
Stretching	None	45	18.4
	Every 30 - 45 minutes	35	14.3
	Every 1 - 2 hours	76	31.0
	Every 3 - 4 hours	53	21.6
	More than 4 hours	36	14.7
Straight hand & wrist	No	79	32.2
	Yes	166	67.8
Thigh horizontal	No	67	27.3
	Yes	178	72.7
Laptop on thigh	No	205	83.7
	Yes	40	16.3

Addressing head position, 70.6% of respondents indicated that their head position is straight. A lower percentage (1.2%) of respondents claimed they had tilted their head to the right, meanwhile 1.6% claimed working with their head tilted to the left. A considerable percentage, 26.5%, said they had many head positions while working with computers.

Another category is stretching behaviors, where the data reveals a varying distribution. 45 respondents in this category or 18.4% do not stretch at all whiles using a computer. 14.3% of those respondents stretched regularly at every 30 to 45 minutes Majority of the respondents stretch every 1-2 hours which is 31.0% or a total of 76 respondents. In the meantime, 21.6% of responders stretch once every three to four hours. Thirty-six respondents, or 14.7%, reported doing extremely infrequent stretching—that is, stretching every four hours while using a computer.

A total of 79 respondents, or 32.2% stated they do not keep their hands and wrists in a straight position when using a computer. 166 respondents, or 67.8%, reported that they were using their hands and wrists correctly. 72% of participants said they regularly maintain their thighs horizontal. The remaining 27.3% of responders, however, were not putting their thighs in the proper position. Finally, this study evaluates the practice of using a laptop on the thigh. Forty respondents, or 16.3%, employ this non-ergonomic position, despite the fact that the majority of respondents do not.

Summary for ergonomic practices among lecturers in Malaysia is shown in Fig. 1. The value is given in percentages. The black area represents percentage of ergonomic compliance, while the grey area represents non-compliance of ergonomic. As depicted on the graph, more than 55% of respondents follow all ergonomic practice while working with computers, except for keyboard viewing distance, where only 38.4% of total respondents comply with ergonomics. Referring to Table 4, 51% of the respondents claimed the distance between keyboard to their eyes is very close, which is less than 63cm.

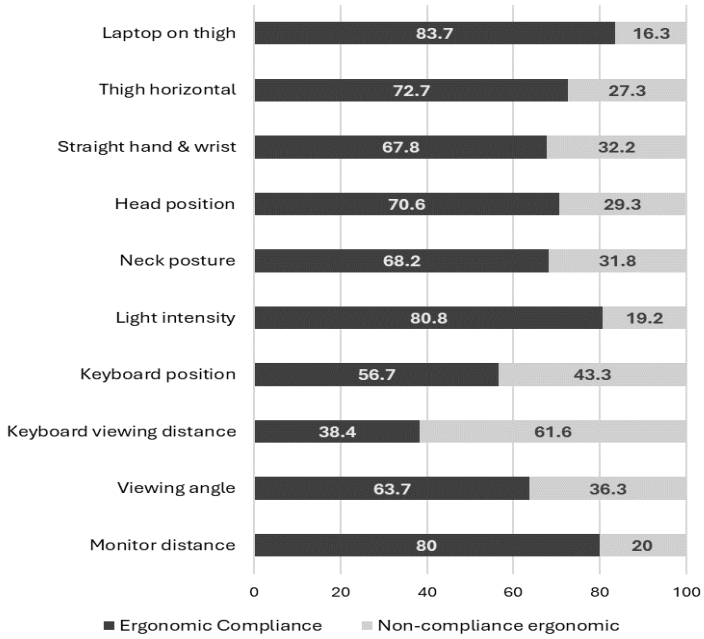

Fig. 1. Ergonomic practices among lecturers

In general, the results are consistent with three previous works, where more than half of the respondents in previous work [10,14, 15] practice ergonomics. However, the respondents of previous study are students and university office workers.

3.2. Computer Vision Syndrome

In this study, three categories of symptom are assessed namely eye, vision and head, neck, and shoulder. Each category consists of many items. For symptoms on eye, 10 items are assessed namely burning eye, itching, tearing, excessive blinking, redness, pain, heavy eyelids, dry, tired, and light sensitivity. For each category, the total score of items is calculated and categorized. For eye symptoms, total score less than 5 is considered as no symptom, score between 5 and 14 is considered mild symptom, score between 15 and 24 is considered moderate, and lastly score of 25 and more is considered severe. Table 6 shows the frequency of eye symptoms according to category. Most respondents have mild eye symptoms with 50.6% or 124 respondents. Another 29.8% of respondents reported having no eye symptoms, while 18.4% reported having mild symptoms. Out of 245 respondents, only 3 exhibit severe eye symptoms, meaning that at this point, medical intervention is necessary. Then, the scores for all 245 respondents were added up and the mean was calculated. The sum for CVS eye symptoms is 2104, the median is 7 and the mean is 8.59. The mean value is in the mild category, which is score between 5 to 14. Therefore, this result indicates lecturers Malaysia has mild CVS eye symptom.

Table 6. CVS symptoms frequency and percentage

Category	No symptom	Mild	Moderate	Severe
Eye symptom	73 (29.8%)	124 (50.6%)	45 (18.4%)	3 (1.2%)
Vision symptom	79 (32.2%)	110 (44.9%)	47 (19.2%)	9 (3.7%)
Head, Neck& Shoulder	37 (15.1%)	105 (42.9%)	68 (27.8%)	35 (14.3%)

Frequency for each eye symptom is depicted in Fig. 2. As shown in the figure, more than 50% of respondents have no symptoms of eye pain, redness, and excessive blinking. Meanwhile, less than 10% of respondents show severe symptoms. The findings indicate that symptoms of dry eyes, light sensitivity, and tired eyes are more serious than the others. In contrast, burning and itching are more common symptoms among Ghanaian university administrative workers, according to findings published by [4]. Additionally, [15] demonstrated a high proportion of undergrad university students in Jamaica with no symptoms for several CVS eye symptoms. Working adults are seen to have eye symptoms of CVS, whereas students do not. Possibly this is because employees use computers for extended periods of time without taking breaks.

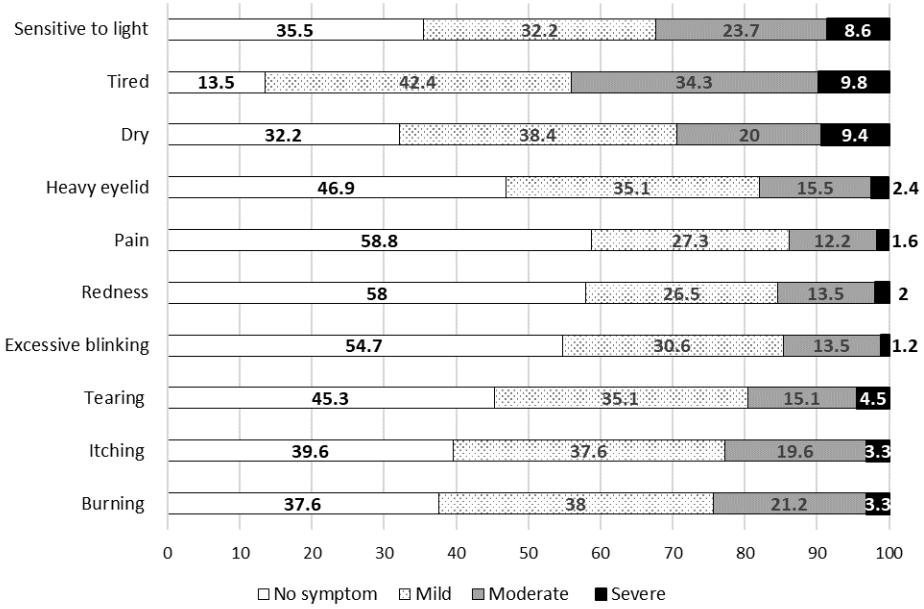

Fig. 2. Frequency of CVS eye symptoms

Vision symptoms consist of 5 items, which give the maximum total score of 15. Therefore, the total item score is categorized as follows: total score less than 3 is considered as no symptom, score between 3 and 7 is considered mild symptom, score between 8 and 12 is considered moderate, and lastly score of 13 and more is considered severe. As shown in Table 6, 32.2% of the respondents do not exhibit any visual symptoms, and 44.9% exhibit mild visual symptoms. There were 47 individuals, or 19.2%, who reported having moderate symptoms. Respondents reporting severe vision symptoms make up 3.7% of the sample, or 9 respondents, more than those reporting eye symptoms. The mean of total score for vision symptom is 4.76, where it is also in mild category.

Fig. 3 shows frequency of five CVS vision symptoms, namely blurred vison, double vision, difficult focusing, colored halos, and worsening sight. With moderate and severe symptoms reported by 31.8% and 11.8% of the respondents, respectively, blurred vision appears to be the primary problem. The same finding was reported by [15]. Additionally, a significant percentage of the severe category is also represented by worsening sight and difficulty focusing. These results contrast with those of a study conducted by [4], which found that over 65% of respondents did not experience difficulties focusing or worsening vision. For colored halo, on the other hand, the results are comparable, indicating that this symptom is not significant.

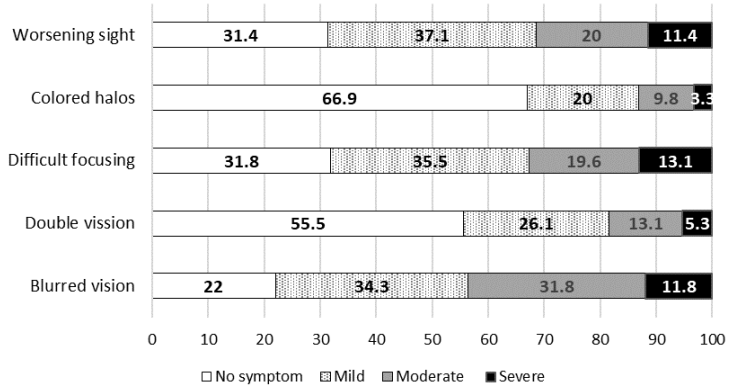

Fig. 3. Frequency of CVS vision symptoms

Another CVS symptom category considered in this study is head, neck and shoulder. Only 2 items in the questionnaire assess this category. The total score of these two items is calculated and categorized based on the following scale: 0 represents no symptom, 1-2 represents mild, 3-4 represents moderate and 5-6 represents severe. Table 6 shows frequency of head, neck and shoulder symptoms. According to the data, 37 respondents, or 15.1%, do not exhibit any head, neck, or should symptoms. A further 27.8% of respondents reported having

moderate symptoms, while 42.9% had mild symptoms. Severe head, neck, and shoulder symptoms are present in 35 out of 245 responders, or 14.3% of the total. The total score mean is 2.45, which is between mild and moderate. Based on the frequency analysis, it shows that more respondents reported experiencing pain in their heads, necks, and shoulders than in their eyes or vision. This finding is in agreement with research by [4] and [15].

The next analysis is to test the association between CVS symptoms and respondents' gender, age, and number of years working using Chi Square. CVS symptoms are represented by summation of each category score and regrouped based on the following scale: 0-1 represents no symptom, 2-4 represents mild, 5-9 represents moderate. As the number of severe respondents is less than 5 and is not acceptable for Chi Square test, the respondent under severe category is combined with moderate category. Table 7 shows the results of association between CVS symptoms and gender. The results show a *p*-value of 0.153, which is larger than the designated alpha level, 0.05. Therefore, there is no association between CVS symptoms and respondent's gender. As for CVS symptoms and respondent's age, the *p*-value is 0.708 which is larger than 0.05 designated alpha value. Therefore, there is no association between CVS symptom and respondent's age. Similar findings also indicate that there is no association between the number of years worked and the symptoms of CVS (*p*-value = 0.325). These findings are consistent with previous study where it showed that CVS has no significant association with age [3] and number of years working with computer [21].

Table 7. Association of CVS symptoms to gender, age, working experience

Association	**Pearson-chi square**	***p*-value**
CVS vs gender	3.758	0.153
CVS vs age	2.149	0.708
CVS vs working experience	6.956	0.325

3.3. Association between CVS and Ergonomic Practice

Chi Square analysis is performed to determine the association between CVS symptom and ergonomic practices. Association between eye symptom and monitor distance, eye symptom and light intensity, vision symptom and monitor distance, vision symptom and light intensity, head, neck and shoulder and head position, neck position and stretching are shown in Table 8. As indicated by the p-value of 0.048, which is less than 0.05, the results indicate that only vision symptoms are associated to monitor distance. However, it is not associated with light intensity. Meanwhile, the other two CVS symptoms, namely eye symptoms and head, neck, and shoulder do not have an association with their related ergonomics practice.

Table 8. Association of CVS symptoms to ergonomic practices

Association	**Pearson-chi square**	***p*-value**
Eye symptom vs monitor distance	3.587	0.465
Eye symptom vs light intensity	2.417	0.299
Vision symptom vs monitor distance	9.566	0.048
Vision symptom vs light intensity	0.563	0.755
Head, neck, and shoulder symptoms vs head position	1.832	0.608
Head, neck, and shoulder symptoms vs neck position	1.354	0.716
Head, neck, and shoulder symptoms vs stretching	19.143	0.085

Based on a Chi-Square analysis of multiple ergonomic and CVS symptoms, the results indicate that most of CVS symptoms among lecturers have no association to ergonomic practices. The finding is in contrast with several previous studies, where a significant association between CVS symptom and ergonomic practice was found [3,4,10,15]. The only difference between this study and them is the respondents. Their respondents are university students and university office staff.

4. CONCLUSIONS

This work studies ergonomic practices and the prevalence of CVS among Malaysian lecturers. A total of 245 lecturers from Malaysia participated in this study. The results have found that most lecturers practice ergonomics in the implementation of their daily tasks in front of the computer. Only a small number of lecturers do not practice ergonomics when working in front of a computer. In general, lecturers show mild CVS symptoms. Next, this study also examines the association between ergonomics and CVS. Association between

eye and vision symptoms to monitor distance and light intensity, as well as head, neck and shoulder to neck and head position and stretching were determined. The results found that only CVS visual symptoms have a relationship with monitor distance. There is no relationship between ergonomics and the other CVS symptoms among Malaysian lecturers.

Funding: This paper has received no external funding.
Conflicts of Interest: There is no conflict of interest.

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Received: February 11, 2024 / Accepted: June 15, 2024 / Paper available online: June 20, 2024 © International Journal of Manufacturing Economics and Management.