Research Paper

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Journal of Eye and Vision

2019
Vol.2No.1:2

Knowledge, Attitude, Perception and Knowledge and Practice of Prevention Practices of Computer Vision Syndrome among Mzuzu University Academic Staff

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Citation: Chisale PE, Mzumara T, Afonne JC (2018) Knowledge, Attitude, Perception and Knowledge and Practice of Prevention Practices of Computer Vision Syndrome among Mzuzu University Academic Staff. J Eye Vis Vol.2No.1:2

Abstract

Purpose: The aim of the study was to determine knowledge, attitude, perception and prevention practices of Computer Vision Syndrome (CVS) among academic staff of Mzuzu University.

Materials and methods: This was a cross-sectional descriptive study among academic staff of Mzuzu University, in Malawi and was conducted in the month of July 2017. Sixty-four participants recruited from a population of 180 academic staff through simple random selection, responded to both, open and closed -ended questions in a questionnaire. Descriptive statistics, Response Averages and Cross tabulation from SPSS version 20.0 and Microsoft excel 2016 were used for analysis.

Results: About 33% of the participants had knowledge of CVS. Headache and eye strain were the most commonly experienced symptoms reported. All the participants knew that phones, tablets, computers and laptops can cause CVS. Participants' attitude and perception of CVS, showed a rather positive, satisfactory and favorable response. The RA value of 'any person is in danger of getting CVS' was 2.97 (SD 1.533). The RA value for 'one can lose a job if he/she tells others they have CVS' was 4.42, (SD 1.378) while for 'why bother about CVS prevention, everyone is going to retire anyway' was 4.44 (SD 1.153). The results indicate that the majority of the participants had positive perception towards CVS. Participants' knowledge and CVS prevention practices, about (80%) reported taking regular visual breaks with (69%) taking breaks after approximately 40 minutes working on the computer while 11% took at least 30 minutes. About (9.4%) said the computer screen is positioned 20 cm away, while (32.8%) put it 40 cm away. Just over half (57.8%) said they did not have a specific distance at which they put their computer screen. Eighty-three percent reported positioning the computer at eye level while 17% put it at an angle. A good number (45%) said Mzuzu University is silent on CVS matters while (55%) said were not sure of what the University is doing towards CVS prevention. Forty-two percent of the participants strongly indicated that there was need for ergonomics team to come and evaluate the working place.

Conclusion: The study found out that Mzuzu University academic staff members have low knowledge levels, high positive attitude and favorable perceptions of CVS. There is lack of awareness of CVS and visual ergonomics at the university. This study was carried among those the society considers most knowledgeable however they had low knowledge of CVS. This emphasizes the need for awareness and education about CVS and its prevention amongst computer users all over world.

Keywords: Computer vision syndrome; Knowledge; Attitude; Perception; Visual ergonomics; Academic staff

Received: October 03, 2018; **Accepted:** May 17, 2019; **Published:** May 24, 2019

Introduction

The advancement in computer technology has made people become more inclined and dependent towards the use of computers for the purpose of education, professional career as well as recreation. With increasing use of computers, involvement and greater number of hours spent in front of the computer screens exposes the users to greater risk of developing Computer Vision Syndrome (CVS) [1]. CVS is defined as a complex of eye and vision problems related to the activities which stress the near vision and which are experienced in relation to or during the use of computers [2]. Today everyone at least has access to these computers or computerized devices. Such devices as phones and tablets are among the most used computerized devices in day to day life. However, computers have associated health-related problems. Musculoskeletal related complaints such as tingling and numbness of the fingers, cervical stiffness and backache are well known to be associated with prolonged usage of computer [3,4]. More recently, visual and ocular problems are reported as the most frequently occurring health (70%) problems among computer users [5].

Computer Vision Syndrome encompasses a group of visual symptoms which emanate from the extended viewing of the video display terminal (VDT), when the demands of the task exceed the abilities of the viewer [6]. Symptoms of CVS include dry and irritated eyes, eye strain/fatigue, blurred vision, red eyes, burning eyes, excessive tearing, double vision, headache, light/glare sensitivity, slowness in changing focus and changes in color perception [5]. It is estimated that nearly 60 million people suffer from Computer Vision Syndrome globally, and that a million new cases occur each year.

Personal computers are one of the commonest office tools, used in almost all institutions/organizations, for a wide variety of vocational and/or non-vocational purposes. It is likely that Computer Vision Syndrome will continue to create a significant and growing contribution to reduced productivity at work, whilst also reducing the quality of life of the computer office worker [7-9].

In a Malaysian study, reported that 43% was not aware of CVS and 47.7% had poor attitude towards CVS [10]. Akinbinu and Mashalla reported 27% knowledge of CVS among computer users in Abuja Nigeria [1]. This differs with Bali et al. [11] who reported 100% awareness. However, they had conducted the study among a population of ophthalmologists who are more likely to know about CVS. Although many studies have been conducted on Knowledge, attitude and perception of CVS, no study has been conducted in Malawi whose profile might differ from other developing nations. Since CVS is associated with long period of computer use, most problems associated with the use of the computer are largely attributed to insufficient knowledge [11,12] hence the need to conduct the study among academic staff who use the computers most often. The study therefore, tried to determine the knowledge, attitude and perception of Computer Vision Syndrome among Mzuzu University academic staff workers who spend about 80 percent of their time on computers because of the nature of their work.

Materials and Methods

The methods and materials used in this study adhered to the guidelines of the declaration of Helsinki and Mzuzu university faculty of health sciences research committee granted approval of the methods and materials used. Informed consent was obtained from all participants and Confidentiality of the participants was ensured [13].

A sample of 64 participants was recruited through simple random selection based on a formula by Singh and Masuku. The participants in the study were those who spent 2 or more hours on the computer per day. Exclusion criteria included; hyperopia of more than one diopter, Females on drug contraceptives and known ocular pathologies.

A well-structured 10-15 minutes self- administered questionnaire was distributed to participants. It consisted of three sections. The first section asked about knowledge of CVS and its symptoms; participants were specifically asked, if they had heard about CVS, how they had heard /means, devices that can cause CVS and if they had experienced any of the following symptoms of CVS and when they had experienced; double vision, blurred vision, eye strain, red eyes, frontal headache. The second section asked about attitude and specifically asked about attitude towards; working close to someone with CVS, losing sight due to CVS, identifying CVS sufferer by appearance, being concerned about CVS only when symptoms are severe. The third section responses were rated on a Likert scale and specifically the following statements; Any person is in danger of getting CVS, Correct use of computers can prevent one from developing CVS, CVS awareness helps one avoid developing it, one can only know they have CVS if they see an eye specialist, one can lose a job if he/she tells others they have CVS, why bother about CVS prevention, everyone is going to retire anyway asked for their perception of computer vision syndrome.

The data were analyzed with the aid of Microsoft excel package 2016 and statistical package for social scientists (SPSS version 20.0). Descriptive statistics and cross tabulation analysis was used.

Results

Demographic data

The study was dominated by male participants 48 (75%) as compared to the female participants 16 (25%). The mean age for participants was 41 years and standard deviation of 3.259. About 17% were Associate Lecturers, who had worked for 1-2 years at the university while 20% were Lecturers who had worked for 3 years or more and had spent an average of 4-6 hours on the computer per day. About 63% were Senior Lecturers who had worked for more than 4 years and had spent on average 4 hours on the computer per day. **Tables 1A and 1B** show the demographic data of participants.

Knowledge of computer vision syndrome

Out of 64 participants, (21/64) (33%) heard of computer vision syndrome, while 43 (67%) reported not hearing it. There was less knowledge (95%CI=0.24-0.44). The distribution of participants

Table 1A & 1B Distribution of respondents according to age, gender, position, time spent on computer.

A

Valid		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	23-27 years	11	17.2	17.2	17.2
	28-32 years	17	26.6	26.6	43.8
	33-37 years	10	15.6	15.6	59.4
	37-76 years	26	40.6	40.6	100
Gender	Males	48	75	75	75
	Females	16	25	25	100

B

Position	Associate lecturer	Lecturers	Senior lecturers	Total
Total number of participants	11	13	40	64
Percent	17	20	63	100
Time spent on computers per day	4hrs or more	4hrs or more	4hrs or more	
Period of lecturing	1-2 years	3 years or more	4years or more	

means through which they heard about CVS **(Figure 1)**. 15% of those who heard about CVS were senior lecturers, 10% were lecturers and 8% were associate lecturers.

Participants heard about CVS from doctor/friend 7 (11%), internet 7 (11%), books and magazines 4 (6%) and radio and television 3 (5%). The participants were also asked if they experience any symptoms during computer use. **Table 2 and Figure 2** show the cross tabulation analysis of hearing about VCS and experiencing its symptoms. Out of the 64 participants 20 [6.6% (H) heard, 13.4% (NH) never heard], (95%CI=0.244-0.404) experienced headache and eyestrain, 16[5.3% (H), 10.8 % (NH)] (95% CI= 0.19-0.331) experienced double/blurred vision, 16 (5.3% H, 10.8% NH) experienced redness of eyes. Some participants 12 (3.9% H, 1% NH) never experienced any of the symptoms.

The study also tried to find out if participants know the devices that can lead to CVS development. About 24 (38%) reported that all the listed devices can cause CVS, while 16 (25%) said computers and desktops are the most likely to cause CVS. About 12 (19%) said laptops are the most probable to cause CVS. 5 (7%) and 7 (11%) reported that tablets and phones can also cause CVS respectively.

Attitude towards computer vision syndrome

Considering the attitude of participants towards CVS, several questions were asked. Over 40 (62.5%), showed an affirmative attitude and said that having CVS, does not mean one is losing their sight. With 8 (12.5%) saying having CVS means one will lose their sight soon while 16 (25%) doubted the claim. Similarly, attitude towards identifying someone with CVS by appearance showed that (59.4%) of the participants disagreed with the assertion, 12 (18.8%) agreed while 14 (21.9%) were not certain.

On the statement "CVS being a personal matter that it has nothing

Figure 1 Distribution of participants who heard about CVS and the means.

Table 2 ''Have you heard of CVS'' symptoms experienced Cross tabulation.

Expected count		Do you experience any of the following symptoms during or after using the computer?				Total
		Eyestrain, Headache	Double/Blurred vision	Redness of eyes	No	
Have you ever heard of computer vision syndrome, CVS?	Yes	6.6	5.3	5.3	3.9	21
	No	13.4	10.8	10.8	8.1	43
Total		20	16	16	12	64

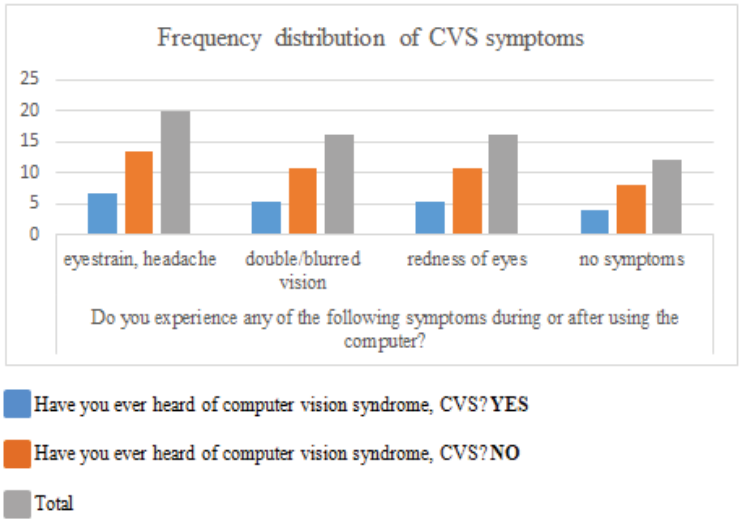

Figure 2 Frequency Distribution of participants who experienced symptoms of CVS.

to do with one's job' 54 (84%) of the participants disagreed with this statement, 8 (13%) not sure while 2 (3%) agreed. Response towards the statement, 'my job keeps me from worrying about CVS matters', 38% of academic staff said their job is a hindrance to CVS matters, with 45% reported that their job does not prohibit them from participating in CVS matters. The rest (17%) of the participants were not quite sure. About 88% of the participants showed a positive attitude and did not agree with the fact that a worker with CVS must not be allowed to continue working at the university while 12% agreed with the assertion. Participants' attitude towards one being concerned about CVS only if the symptoms are severe 47 (73%) of participants disagreed that people should only be concerned about CVS only when symptoms are severe. 7 (10%) agreed that one with CVS should only be concerned when symptoms are severe 10 (15.6%) were undecided, **Figure 3** shows participants' attitude towards one being concerned about CVS only if the symptoms are severe.

Perception of computer vision syndrome

Based on the design of our questionnaire responses to aspects of perception were restricted to range from 1-5, (Likert-scale) corresponding to five categories, namely; 1 for agree, 2 for strongly agree, 3 for neutral, 4 for disagree and 5 for strongly disagree. To analyze this, we calculated the response averages

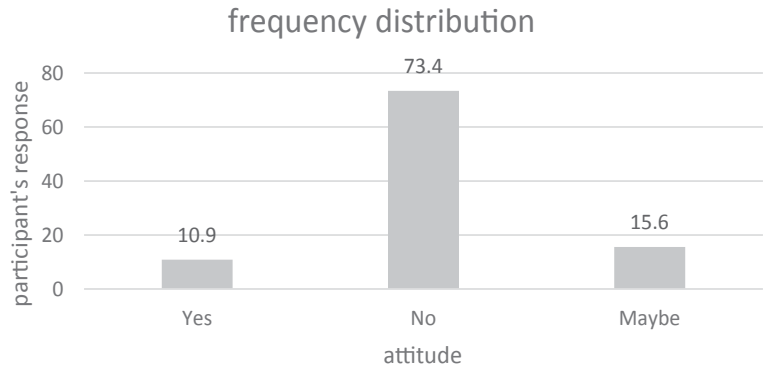

Figure 3 Participants' attitude towards one being concerned about CVS only if the symptoms are severe.

Table 3 Participant's results of response average on perception.

	Mean	Std. Deviation
Any person is in danger of getting CVS?	2.97	1.553
Correct use of computers can prevent one from developing CVS	2.09	1.433
CVS awareness helps one avoid developing it	2.44	1.258
One can only know they have CVS if they see an eye specialist	2.19	1.125
One can lose a job if he/she tells others they have CVS	4.42	1.378
Why bother about CVS prevention, everyone is going to retire anyway	4.44	1.153

for each variable as shown in **Table 3**. The RA to each question produced a good indication towards the two ends of the scale. With the Likert scale restricted to 5, an RA value of 3 is the mid-point and renders the overall response towards the 'neutral' direction. An RA value of less than 3 inclines the response towards the direction 'agree' and RA value of greater than 3 inclines the responses towards the direction of 'disagree'.

The RA value of 'any person is in danger of getting CVS' was 2.97, (SD=1.553). This indicates that the majority of participants agreed that any person is in danger of suffering from CVS. For 'correct use of computers can prevent one from developing CVS' the RA was 2.09, (SD=1.433). The RA, for 'CVS awareness helps one avoid developing it' was 2.44, (SD=1.258) while for 'one can only know they have CVS if they see an eye specialist' was 2.19 (SD=1.125). The RA value for 'one can lose a job if he/she tells others they have CVS' was 4.42 (SD=1.378) while for 'why bother about CVS prevention, everyone is going to retire anyway' was 4.44 (SD =1.153).

Knowledge and prevention practices towards CVS

The majority (69%) take visual breaks after approximately 40 minutes, 11% break at 30 minutes while 20% do not take visual breaks. Regarding the viewing distance, 9.4% position their computers 20 cm away, while 32.8% position theirs at 40 cm away. Over half (57.8%) do not have a specific viewing distance. The majority (83%) position the computer at eye level while 17% put it at an angle.

Some (44%) participants change gazes when working on the computer while over (56%) do not and felt it does not help reduce CVS. Participants were also asked if the university is doing anything to reduce the effects of CVS, about (45%) said the school is silent on CVS matters. While (55%) said they were not sure of the University's position on CVS matters. Participants were then asked if it is necessary to have ergonomics team to evaluate their working place. With (42%) strongly indicating that there was need for ergonomics team to come and evaluate the working place while (58%), felt it was not necessary.

The participants were finally asked to suggest ways of avoiding CVS at MZUNI. With (34%) suggesting that there must be an awareness campaign about computer vision syndrome targeting academic staff, secretaries and students who are the risk population to develop CVS. Twenty percent suggested that computer users should seek advice from eye specialist on the use of computers. While 40% said reducing computer brightness and working in a good lit area/office can help reduce the effects of CVS. Some (6%) suggested that the school should employ more lecturers so that fewer courses are taught by one lecturer hence reducing the time spent on computers leading CVS prevention.

Discussion

This study was done to determine the level of knowledge, attitudes, perception and knowledge of and prevention practices of CVS among MZUNI academic staff. The percentage of respondents who had sufficient knowledge of CVS was only 33%. The Knowledge of CVS among Mzuni academic staff was poor. This result is similar to a study conducted by Chiemeke et al. [14] in Nigeria who reported 32% of CVS knowledge. It is in contrast to the study by Zainuddin and Isa [15] in Malaysia, who found that only 35.6% of respondents had poor knowledge about CVS. Poor knowledge of CVS among respondents at the university may be due to the factors below. 'Firstly, the terminology of CVS was unfamiliar to most participants, despite most of them experiencing its symptoms.' 'The second factor is that, there has never been awareness program about CVS targeting the academic staff'. 'Thirdly, the symptoms of CVS tend to go away once one stops using the computer hence respondents do not bother to ascertain what the condition may be and the impact it has on their work output'. The majority of academic staff who heard and were aware of CVS were the senior lecturers. They had been at the university for so long; teaching, and used the computers longer than 3 hours per day. They had acquired about CVS through the symptoms they experience. The level education among these people is high and are considered to have an open approach to ideas or situations hence this could explain their majority. 'The other reason could be that the university management does not take the initiative to provide the necessary education about CVS through the readily available eye specialists in the faculty of health sciences, optometry department. There are so many means through which those knowledgeable of CVS came to know about it. Most respondents learnt it from the internet 7% and 7% eye specialist while the rest read from books and magazines. The lack of knowledge among the majority of participants indicates the need for inclusive awareness among the population. Much as the symptoms of CVS disappear when one stops using the computer, they lead to lugging in execution of work hence low productivity [7,16]. Headache and eyestrain were the most experienced symptoms followed by double /blurred vision and redness of eyes. This study correlates with the findings obtained by Chiemeke et al. [14] and shantakumari et al. [17] where they found that 53.4% and 53% of the study population experienced headaches respectively. This result is also in line with a similar study conducted by Bali et al. [5] and Reddy et al. [11] in Malaysia who found that the major symptoms reported by the ophthalmologists were: eyestrain (97.8%), headache (82.1%), tiredness and burning sensation (79.1%). The responses to the symptoms, as compared to the previous studies reveals higher percentage of headache and eyestrain as reported before by other researchers [5]. The results also show that (100%) all participants knew that CVS can be caused by, tablets, laptops and desktops or any of the computerized devices above which implies that CVS could be more common than it is reported.

Attitude and perception towards computer vision syndrome

There is a favorable and positive (73%) attitude towards CVS from the results of this study. This compares with a Malaysian study by Amirul et al. [10] who reported that 43% was not aware of CVS and 47.7% had poor attitude towards CVS. Comparably a study by Mujaddidi [18] in Semarang showed that none of the respondents were aware of CVS and risk factors of CVS incidence. The reason

for positive and good attitude in our study may be attributed to the fact that academic staff experience the symptoms and fully understand that even though they don't know the cause, they experience CVS most often. While considering that CVS is not contagious but can have serious impact on the productivity of someone's life, participants showed an overall good attitude and perception towards CVS matters. The findings of this study on perception based on the RA analysis collectively shows that respondents agreed that any person is in danger of developing CVS. They also agreed that correct use of computers can prevent one from developing CVS. They further agreed that CVS awareness helps one avoid developing it as well as one can only know they have CVS if they see an eye specialist. The results also show that the participants disagreed, that one can lose their job if he/she tells others they have CVS as well as why bother about CVS prevention; everyone is going to die anyway.

The results somewhat portray an interesting scenario where participants have poor knowledge of CVS yet possess positive and impressive attitude and perception towards computer vision syndrome. This scenario, whereby the academic staffs possess low levels of knowledge and high attitude perceptions yet experience symptoms of CVS. This might be one reason making them fail to logically evaluate CVS information in order to make healthy choices. A study conducted by Mvungi et al. [19] in Africa showed that the occurrence of CVS was mainly caused by poor knowledge about the proper attitude when working with the computer. Given enough knowledge and awareness computer users are likely to employ better ways to avoid developing CVS. Logaraj et al. [20] were for the view that a person must possess the ability to receive, process and make sense of information in order to (for example) switch to safer behavior. Thus one must possess knowledge of CVS and its associated risk factors in order to make proper choice to avoid developing it [20,21].

Knowledge and practices of prevention practices of CVS

Results of Knowledge of prevention practices and good ergonomics at work shows a positive response as most participants indicated taking visual breaks 80%, at variable frequencies most of whom, after 40 minutes of computer usage. Gaze changes with respect to computer use, also plays a role in CVS prevention. In this study 44% showed that CVS development can be avoided through gaze changes. When one changes gazes frequently, they change angle of gaze. As stated by Health Hub from Cleveland clinic, for the best angle, the center of the monitor, tablet or phone should be about 60 cm from the user's eyes and about 12 cm below eye level [8]. Where the user is looking back and forth between a screen and reference materials, they keep those materials where they can be seen with minimal head movements preferable parallel to the computer screen. Working distance from the computer, 33% indicated that 40 cm was the most appropriate. The results also indicated that a large proportion of the participants 58%, did not consider working distance as necessary in CVS prevention. Also 83% in this study indicated placing the computer at an eye level in front of their face. But research has shown that poor working and position distances of the computer and other related video display terminals can also lead to an increase in CVS. Bilton proposed a three-way approach '1, 2, 10' to describe commonly adopted working distances, with mobile phones and e-books typically being held at about 30 cm away, desktop computers or laptops being viewed at about 60 cm, while televisions are often viewed at a distance of approximately 3 m [8]. Other studies have shown that improvement of physical ergonomics reduces discomfort at computer stations and improves performance [10]. A study by Chiemeke et al. [14], in Nigeria showed that only 32% of respondents knew about the prevention of CVS. While a study by Mujaddidi [18] in Semarang showed that none of the respondents were aware of the risk factors of the CVS incidence.

This study also reveals that participants are not aware of visual ergonomics and ways through which onset of CVS can be avoided. Some suggested that having the specialist in this field to raise awareness and offer good computer usage practices in order to avoid CVS is the best approach. A research on visual ergonomics conducted by Zainuddin and Isa [15] in Malaysia showed that the respondents had less knowledge about visual ergonomics. A similar study conducted by Khan et al. [4] in Pakistan showed that only 30% were aware of the visual ergonomics at the workplace. Poor knowledge is further shown by the university's silence on CVS matters.

A study conducted by Mvungi et al. [19] in Africa showed that the occurrence of CVS was mainly caused by poor knowledge about the proper attitude when working with the computer. The occurrence of CVS among respondents was high however, the knowledge about it is still poor, the respondents were unaware that they suffered from CVS and did not know about its prevention. If CVS is left untreated it might cause an individual to experience obstacles in their daily activities, decrease work productivity, increase in the level of error in their work, as well as a decrease in job satisfaction.

Conclusion

Our study had assessed knowledge, attitude and perception of computer vision syndrome of academic staff at Mzuzu University. The results from this study show that there are low knowledge levels among Mzuzu university academic staff. However, there is positive and satisfactory attitude and perception of computer vision syndrome among the staff members. The lack of knowledge suggests the need to raise awareness to computer users in the community and society at large. The academic staffs are considered most knowledgeable in many aspects which are contrary to the findings of this study. Further studies can look at prevention practices of computer vision syndrome and a qualitative study may help to quantify the differences of knowledge, attitudes and perceptions of CVS among the computer users.

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