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REVIEW ARTICLE

Efficiency of Video Aided Teaching Instruction for Computer Professionals in Selected Firms in Bengaluru on Computer Vision Syndrome and Contextual Factors

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ABSTRACT
Increased use of visual screen in the workplace may cause trait of general fatigue, eyestrain or irritation, and muscle pain. Digital eye strain is a vision condition brought on by extended periods of continuous computer use. Aim: To ascertain occurrence of digital eye strain its contextual factors, and assess the knowledge of Computer vision syndrome among computer professionals in selected companies in Bangalore. A quasi-experimental one-group pre-test-post-test design was adopted in the investigation. 215 research participants were chosen via non-probability purposive sampling. By using a checklist, the occurrence of digital eye strain and its contributory were determined. With respect to the severity of CVS, the participants were divided into three subgroups: 1. Mild CVS (1-4), 2. Moderate CVS (5-7), 3. Severe CVS (9-11). Knowledge of computer professionals on CVS was acquired through self-administered questionnaires by using baseline Performa and questionnaires. After the pre-test, video aided teaching instruction was displayed and the post –test was proceeded seven days later. Most of the subjects reported pain in and around the eyes (83.7%), and headache (82.8%) and the linear regression analysis computed, identified that artificial lighting (p =.036) was the most significant factor associated with indicating that the severity of CVS symptoms among computer workers is predicted to worsen by 0.696 units. The computer professionals had a substantial mean difference (10.28) between their pre-test and post-test knowledge levels (t_{214}=-40.65, p<0.001); It shows that the video-aided teaching instruction was successful enhancing the understanding Computer Vision Syndrome amid of computer specialist. Most of the individual reported moderate CVS. A comprehensive strategy for raising awareness and implementing appropriate workstations is needed to prevent CVS among computer professionals and to help them work in a safe and healthy setting.*
***Keywords**: computer professionals; Video aided teaching instruction; Computer vision syndrome*

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INTRODUCTION

A Computer is a versatile friend that can process millions of operation per second. People around the world use the computer as their primary business tool,[1] and the utilization of computers has expanded in multiple field, and it has been connected with growth of health hazards, especially to the eyes . Video display terminal use in the workplace has expanded as a result of the development of information technologies in recent years; the professionals were keen to use the computers [2]. Information technology has penetrated the lifestyles and trend continues to grow at a faster pace than ever before. People working in multinational companies have to carry out the job with help of computer system in very tight schedule extending period of time more than 12hours. Protract computer use can cause a variety of health problems, including visual impairment, neck and back discomfort, restlessness, weak muscles, stress, sadness, and gloom [3].

According to a 2015 survey, India has the largest base of computer users; this survey reveals 71% of men and 29% of women were using a computer in India [4]. A health survey conducted on professionals, working in software development showed that 31% of subjects had neck and shoulder problems, 15% had wrist and hand pain, 26% had tiredness, and 12% were exhausted at the end of the day, The visual problems were seen in 76% and musculoskeletal problem in 75% of the subjects. The increase use of

computer in workplace reports high level of ocular discomfort, eye strain headache, light sensitivity, double vision, and color distortion. The PC users were not aware of the safety precautions that should be taken when using a computer, such as suitable illumination, glare prevention, ergonomic monitor positioning, and work breaks that might enhance visual comfort [5]. The analyst believes that health care providers should be the ones, raising awareness among those who may be susceptible to Computer Vision Syndrome, and that this current study will serve as a first step in that regard.

MATERIAL AND METHODS

Resources and procedures

Design and samples:

A quasi-experimental one-group pre-test post-test design was used, and it took place in Chipware Technology Private Limited and Nixserv IT Technology Private limited Bangalore. Both companies were privately held company focusing on software development. The setting was chosen based on the feasibility and availability of subject. More than 300 hundred people work as computer-aided engineers, programme testers, and graphic designers for this organization. On average they work 10-15 hours a **d**ay**,** 5 days a week .The study population consisted of male and female computer professionals who have between the ages of 21 and 50 worked in the software industry such as Chipware Technology and Nixserv IT Technology Private Limited. Based on inclusion as well as exclusion criteria 215 computer professionals was surveyed. The researcher excluded those have prior knowledge of CVS and only included those who were willing to participate, working more than 3-4 hrs. /day and could understand English in the sample. The researcher introduced herself and explains the nature and purpose of the study. After obtaining informed consent, they were incorporated into this study. Purposive sampling, a non-probability sampling approach, was used to select the sample.

MATERIALS OUTCOME MEASURES:

Section I: Demographic Performa - It consisted of details related to baseline characteristics, Information related to ergonomic factors, and Information related to health care activities.

Section II: Checklist to identify the widespread presence of CVS among computer specialist. The checklist consists of 11 statements that describe the various symptoms related to computer vision syndrome. The responses given are either Yes or No, for which the scores given are 1 and 0 respectively. Based on a descriptive study conducted in Srilanka, the degree of CVS classified the participants into three subgroup, 1. Mild CVS (1-4), 2. Moderate CVS (5-7) 3. Severe CVS (9-11. The tool was validated by experts. The Spearman-Brown prophecy formula was used to compute the reliability coefficient of the tool

Section III: A self-structured questionnaire was created to gauge computer specialists' familiarity with CVS. It consists of 30 knowledge questionnaires of CVS include (definition, cause, signs and symptoms, diagnostic tool, preventive measures and management of CVS) with 4 responses. The subject has to select any one response. One point was awarded for each accurate answer and for each erroneous response, a zero.

PROCEDURE:

Chipware Technology and Nixserv IT Private Limited Bangalore granted the researcher's request for permission to conduct the study in advance. On February 19, 2020, the research proposal (IEC No. PGN-13) was presented to the institutional ethics committee for approval. The Managers of both companies provided formal written approval. The investigator introduced her, explained the purpose of the study to the computer professionals, and obtained the consent form. Once the consent form was obtained, Google forms were sent to the computer professionals through email. Data were collected by administering a self-administration tool and checklist. The video-aided teaching instruction program was also completed on the same day the computer professionals took the pre-test. The post-test was done utilizing the same questionnaire after the video teaching for seven days.

INTERVENTION:

The video teaching is played for thirty minutes and its consists of definition, causes of CVS, signs and symptoms, diagnostic measure to identify the CVS, management and prevention of CVS. After the pre-test, the researcher showed the video to the computer experts and answered their questions and cleared up any confusion.

Statistical interpretation

Statistical package of social science version 20 was used to enter and analyse the obtained details. The most contributing factors of computer vision syndrome were determined using the linear regression analysis. When the computer professionals' pre-test and post-test knowledge scores were compared in relation to their understanding of computer vision syndrome, a paired t-test was used.

RESULTS

Section 1: Dissemination of participants according to baseline attribute;

Table 1: Frequentness and percentile distribution of subjects based on Age, Gender, Professional qualification, Duration of work, and years of working experience. **N=215**

Sl.no	Baseline attribute	Frequentness	Percentile
1	**Years of Age**		
	21-30	51	23.7
	31-40	123	57.2
	41-50	41	19.1
2	**Gender**		
	Male	92	42.8
	Female	123	57.2
3	**Professional Qualification**		
	Bachelor	108	50.2
	Master	107	49.8
4	**Duration of work**		
	3-5 hours each day	14	6.5
	6-8 hours each day	88	41.0
	9-12hours each day	102	47.4
	Above 12 hours each day	11	5.1
5	**Years of working experience**		
	1-5 years	45	20.9
	6-10years	50	23.3
	10-15 years	90	41.9
	Above 15 years	30	14.0

The majorities of the subjects are between the ages of 31-40 years (57.20%), were females (57.20%), and were graduates (50.20%), and also 41.9% computer specialists possess more than ten years of work experience in the field of technology, and 47.4% worked more than nine hours every day. (Table-1)

Section II: Estimating the widespread presence of CVS among computer specialist

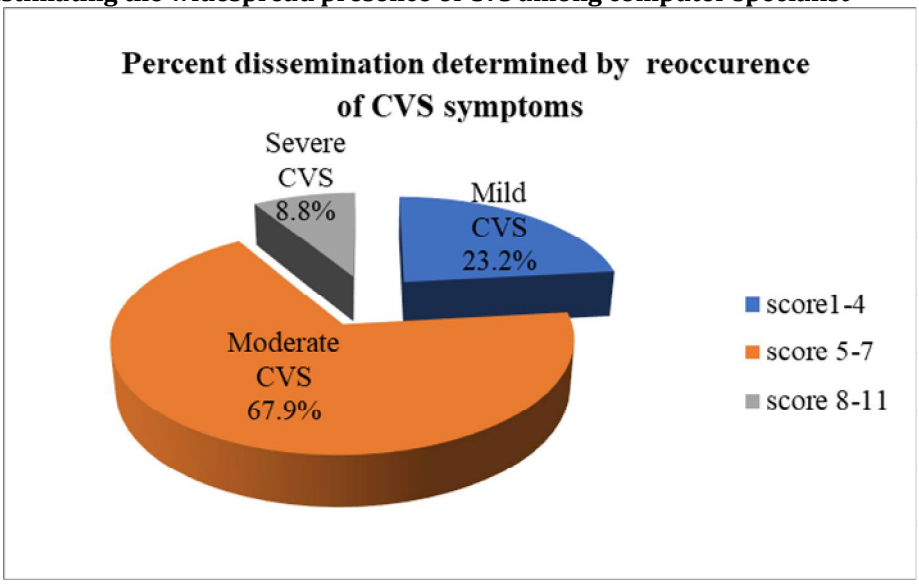

Figure 1; Recurrence as well as percent dissemination of the individuals' CVS

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In the descriptive study conducted in Sri Lanka, the participant with CVS was split into three categories depending on the severity of CVS.[10]: 1. Mild CVS (1-4), 2. Moderate CVS (5-7), 3.Severe CVS (9-11). Using checklist the symptoms were identified by researcher, it consists of 11 items related to CVS. Majority of the subjects23.2% had mild computer vision syndrome, 67.9% 0f the subject had moderate computer vision syndrome, and 8.8% of the subjects had severe computer vision syndrome. The occurrence of CVS among subjects with pain in and around the eyes (83.7%), followed by headache (82.8%), dry eye (71%) (Table-2)

Table 2: Frequentness and percent of occurrence of CVS among computer professionals

		N=215
Sl. No	**Symptoms**	**Percentage**
1	Pain in and around the eyes	83.7
2	Headache	82.8
3	Dry eye	71
4	Sore /irritated eye	64.7
5	Blurred near vision	42.8
6	Red-eye	41.4
7	Blurred far vision	36.7
8	Twitching of eyelid	36.3
9	Excessive tearing	29.2
10	Changes in visualizing color	27
11	Double vision	21.4

Section III: Elements associated with the severity of Computer vision syndrome

Table 3: Relation between the independent variable and CVS using regression analysis. [N= 125]

Sl.no	**Variables**	**N%**	**Beta value**	**p-value**
1	**Source of lighting**			
	Natural	57 (26.5)	0.696	0.036
	Artificial (ref)	158(73.5)		
2	**Brightness of screen**			
	Yes	128 (59.5)	-0.208	0.488
	No (ref)	87 (40.5)		
3	**Ergonomically chair**			
	Yes	144 (66.9)	0.057	0.853
	No (ref)	71 (33.1)		
4	**Using contact lens**			
	Yes	180 (83.7)	0.018	0.964
	No (ref)	35 (16.3)		
5	**Use of an antiglare screen**			
	Yes	182 (84.6)	-0.294	0.482
	No (ref)	26(13.4)		

Regression analysis was computed, to identify the artificial lighting p (.036) was most significant factor. It can expect 0.696 units to increase the severity of symptoms of CVS.
(Table-3)

Section IV: Distribution of computer experts' pre- and post-test knowledge scores.

Table 4: Frequentness and percent dissemination of subjects on the authority of their level of knowledge score. **[N=215]**

Level of knowledge	Score	Pre test		Post test	
		Frequency	percentage	Frequentness	percentage
Inadequate knowledge	0-15	206	95.8	1	0.5
Moderate knowledge	16-22	9	4.2	156	72.5
Adequate knowledge	22-30	-	-	58	27
Total	30	215	100%	215	100%

In pre-test, majority of the subjects 95.8% (f=206) had inadequate knowledge, none of the subjects had adequate knowledge, and only 4.2% (f=9) of the subjects had knowledge that was intermediate. Respectively in the post-test 0.5 % (f=1) of the subjects had inadequate knowledge, 72.5 % (f=156) of the subjects had intermediate knowledge and 27 % (f=58) of the subjects had of adequate knowledge (Table-4).

Section V: Efficacy of Video-aided teaching instruction on knowledge of CVS among computer specialist.

Table 5: Efficacy of video-aided teaching instruction on computer professionals understanding of computer vision syndrome [**N=215]**

Sl.no	Groups	Mean	SD	Mean difference	Paired t-test	p-value	Inference
1	Pre-test	10.809	3.0165				
				10.282	-40.651	<0.001*	S*
2	Post-test	21.191	2.6503				

S*-significant

The pre-test and post-test knowledge scores of the computer professionals were compared with relation to their understanding of computer vision syndrome, a paired t-test was used. Since the mean post-test knowledge score (21.19 ± 2.65) was greater than the mean pre-test knowledge score (10.80 ±3.01), the mean difference (10.28) between the computer professionals' pre-test and post-test knowledge scores was deemed to be significant $p<0.001^*$, Thus, the research hypothesis is acknowledged and ended. It shows a highly significant rise in the knowledge level of computer professionals among Computer vision syndrome following the administration of Video -aided teaching instruction programme.(Table-5)

DISCUSSION

The results of the current study show that, the greater number of subjects (47.4 %) of computer professionals were working more than 9 hours. Similar findings were reported by the study on CVS prevalence and contributing factor among medical students in Kist medical college, Nepal [6]. (42%) of the subjects that the used to spend more than 6 hours in a day. It is clear from the data that CVS symptoms worsen after using a computer for longer than 6 hours. [7] And also the majority (83.7%) of the computer professionals reported pain in and around the eyes, (82.8%) reported headache. A study conducted among university students regarding occurrence and risk variables and came to a nearly identical conclusion that the highest prevalent symptoms of CVS reported by the individuals were eye pain (82.7%) and headache (45.7%) [8].The finding of the study shows that the highest common CVS indicator reported by the respondents were pain, headache, and dry eyes. In a number of previous comparable research, headaches were generally the symptom that computer users reported experiencing the most frequently.

The percentage distribution of computer professionals regarding the affected eye revealed sore/irritated eye (64.7%), blurred near vision (42.8%), blurred far vision (36.7%), twitching of eyelid (36.3%). These findings confirm with findings of another study which was conducted in Sri Lanka among 2210 computer office workers: an evaluation of prevalence and risk factors which revealed that the common eye affected symptoms are (51.5%) of the people sore eye, (44%) of the people had blurred near vision, 39 % of the people had blurred far vision, (22%) of the people had twitching of eyelids. From the above findings, it can be stated that the most pronounced eye symptoms are sore /irritated eye, blurred near and far vision, and twisting of eyelids.[9]

The present study finding depicts that the most significant associated factor was (p.036) artificial lighting. Evidence from many other studies reported that exposure to artificial light on a computer at work was a substantial risk factor for CVS [10].Tesfaye AH and Alemayehu M, conducted in Northwest Ethiopia reported in their study that more pronounced a visual symptom was visible in people exposed to artificial light for 6–9 hours daily on a computer [11]. The finding of the study divulge that immediate action is needed to modify these associated factors and create safe work ergonomics for computer professionals.
In the present study, the brightness of screen p (0.488) and use of anti-glare screen p (0.482) were moderately associated factors among computer professionals. An almost similar study was conducted in Sri Lanka among 2210 computer office workers, an evaluation of prevalence and risk factors revealed that those who adjust the brightness of screen p (0.74) and use anti-glare screen p (1.01) were moderately associated with CVS. [9]
The findings of the present investigation show that pre-test and post-test knowledge scores had a mean difference (10.28) that was deemed to be significant. There was a substantial difference between the knowledge score on the pre-test and the knowledge score on the post-test about CVS among computer specilaist, a study conducted in Balgalkot among office workers. [12]. It demonstrates a significantly substantial increase in computer professionals' knowledge of CVS following the implementation of a video-assisted teaching method.
Corresponding findings of the current research, as it pertains with comprehension of CVS and contextual factors, there was a substantial difference between the knowledge scores of the computer professionals on the pre-test and post-test. This result is in line with a research that was done to determine how successful video instruction was at teaching staff nurse regarding non pharmacology pain relieve intervention on children. A similar finding is obtained in studies conducted in pune (India) and both studies revealed that video-assisted teaching will enhance the awareness of digital eye strain among computer professionals [13].
The present study finding reveals that there is a significant association between computer vision syndrome and ergonomics design such as brightness of the screen, use of an ergonometric chair, use of anti-glare screen which is lesser than (P=0.05). This finding is consistent with that of a cross-sectional study was conducted in Ethiopia which explored that there is a significant association between the ability to adjust screen brightness and use of the ergonometric chair and using an antiglare screen while working on the computer [14].
Analysis and discussion on present study findings, it helps investigator to develop in-depth insight into the findings of various studies on CVS and associated factors among computer professionals. Additionally, the outcome demonstrated that the majority of the experts were coming under moderate CVS category, which showed the need for implementation of programs that include the concepts of CVS, ergonomics, preventive measures and health education of personnel to be able to avert and overcome the phenomenon of digital eye strain.

CONCLUSION

The computer has become a standard tool in classrooms, institutions, and businesses as a result of technological advancement and reliance on information technology. According to published research, visual problems are linked to extend viewing of VDT. The present study reveals that more than three-quarters of computer specialist complain of any CVS symptom while wield a computer. Visual symptoms with regards to headache, ocular surrounding area discomfort, and the most significant associated factor was artificial lighting. It can expect 0.696 units to increase the severity of symptoms of CVS. It showed that there is a need to create awareness and guide computer professionals on health and safety measures in work ergonomics. Hence it is imperative to optimize the exposure duration and better encourage user awareness of the issue by providing rigorous training and managerial assistance.

CONFLICT OF INTEREST

Author has nothing to declare as a conflict of interest related to the paper.

REFERENCES

1. Del Mar Seguí M, Cabrero-García J, Crespo A, Verdú J, Ronda E. (2015). A reliable and valid questionnaire was developed to measure computer vision syndrome at the workplace. Journal of Clinical Epidemiology. 1;68(6):662-73.
2. Blehm C, Vishnu S, Khattak A, Mitra S, Yee RW. (2005). Computer vision syndrome: a review. Survey of Ophthalmology. 1;50(3):253-62.
3. Jegede BS, Oyesomi TO, Okesina AA, Jimoh OR, Ajao MS. (2012). Visual Hazards Associated With Using Computers. Tropical Journal of Health Sciences. 9(1).12-17

4. Sayed SH, Abd El Wahed AY, Madian AA. (2020). Effect of interactive digital-based educational intervention about digital eye strain on the severity of eye complaints, knowledge and preventive ergonomic practices among computer users. American Journal of Nursing. 8(1):48-59.
5. Sayed SH, Abd El Wahed AY, Madian AA. (2020). Effect of Interactive Digital-based Educational Intervention about Digital Eye Strain on the Severity of Eye Complaints, Knowledge and Preventive Ergonomic Practices among Computer Users. American Journal of Nursing. 8(1):48-59.
6. Basnet A, Basnet P, Karki P, Shrestha S. (2018). Computer Vision Syndrome Prevalence and Associated Factors Among the Medical Student in Kist Medical College. Nepales Medical Journal. 2;1(1):29-31.
7. Yan Z, Hu L, Chen H, Lu F. (2008). Computer Vision Syndrome: A widely spreading but largely unknown epidemic among computer users. Computers in human behaviour. 1;24(5):2026-42.
8. Al Tawil L, Aldokhayel S, Zeitouni L, Qadoumi T, Hussein S, Ahamed SS. Prevalence of self-reported computer vision syndrome symptoms and its associated factors among university students. European journal of ophthalmology. 2020 Jan;30(1):189-95.
9. Ranasinghe P, Wathurapatha WS, Perera YS, Lamabadusuriya DA, Kulatunga S, Jayawardana N, Katulanda P. Computer vision syndrome among computer office workers in a developing country: an evaluation of prevalence and risk factors. BMC research notes. 2016 Dec;9(1):1-9.
10. Reddy SC, Low CK, Lim YP, Low LL, Mardina F, Nursaleha MP. Computer vision syndrome: a study of knowledge and practices in university students. Nepalese journal of Ophthalmology. 2013 Sep 23;5(2):161-8
11. Tesfaye AH, Alemayehu M, Abere G, Mekonnen TH. Prevalence and associated Factors of computer vision syndrome among academic staff in the University of Gondar, Northwest Ethiopia: An institution-based cross-sectional study. Environmental Health Insights. 2022 Jul;16:11786302221111865.
12. An Effectiveness of Self Instructional Module on Knowledge Regarding Effects of Computer Vision among Office Staff Working in Selected Organization of B.V.V. Sangha Bagalko International Journal of Innovative Science and Research Technology.Volume 4, Issue 3, March – 2019
13. Rajesh S, Swamy AA. (2014). Effectiveness of video assisted teaching programme on knowledge regarding non pharmacological pain relieving intervention for children among staff nurses in selected hospital. Asian journal of multidisciplinary studies. 2(10):122-33.
14. Dessie A, Adane F, Nega A, Wami SD, Chercos DH. (2018). Computer vision syndrome and associated factors among computer users in debre tabor town, northwest Ethiopia. Journal of environmental and public health. 18:90-97

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