Original Article

Effectiveness on knowledge about computer vision syndrome among medical coding trainee in medical coding training institute in urban Chennai, Tamil Nadu – A cross- sectional study

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Abstract

Context: Electronic devices, laptops, tablets, ipad and smart phones are an integral part of one's life both in work and personal space. Excessive usage of these devices had led to health-related problems of which computer vision syndrome (CVS) is at risk of becoming a major public health issue. **Aims:** Our study aimed to assess the pre-test and post-test level of knowledge regarding CVS among the medical coding trainees and also to determine the effectiveness (Video Teaching Programme) of knowledge about the CVS among them. **Methods and Material:** After obtaining ethical committee clearance using universal sampling method 480 medical coding trainees working in a firm was included in this study. A structured questionnaire was used to interview and a video teaching programme was given between the pre and post-test sessions for about 45 minutes regarding the effects of Computer Vision Syndrome. **Results:** The level of knowledge about CVS among medical coding trainees in the pre-test and post-test was 280 (58.3%) and 8 (1.7%) had inadequate knowledge, respectively. With regards to adequate level of knowledge 24 (3%) and 328 (68.3%) had in pre-test and post-test phase, respectively. The comparison of knowledge shows a very good improvement among the medical coding trainees which was significant ($p < 0.001$). **Conclusions:** The study highlights health education as an important factor in increasing the knowledge. From a primary care point of view, knowledge regarding CVS helps in differentiating and addressing the ocular symptoms, headache and shoulder pain symptoms of other aetiology if history is elicited properly.

Keywords: Computer usage, computer vision syndrome (CVS), medical coding, mobile phone

Introduction

Electronic devices, laptops, tablets, ipad and smart phones are an integral part of one's life both in work and personal space. Excessive usage of these devices with visual displays had led to health related problems of which computer vision syndrome (CVS) is at risk of becoming a major public health issue.[1] The American Optometric Association defines computer vision syndrome or digital eye strain is "a group of eye- and vision-related problems that result from prolonged computer, tablet, e-reader and cell phone use".[2] The commonest office tools used in almost all institutions in the twenty first century are

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computers, laptops, smart phones etc., for variety of vocational and non-vocational purposes. So, it is likely that CVS will continue to create reducing QOL among the workers/students and also creating significant reduced productivity at work/studies.[3-5]

The most frequently occurring health related problems among computer users were neck and back pain, shoulder and wrist pain, CVS, an over use syndrome resulting in ocular and musculoskeletal discomfort. Students who are frequent computer users are at increased risk of poor postural problems and CVS.[6,7] A high percentage of computer users have been found to have under or uncorrected vision problems which may affect their visual performance and comfort.[8]

The prevalence of CVS ranges from 64% to 90% amongst computer users with nearly 60 million people affected globally.[9,10] A nationwide study in Sri Lanka reported that more than two-thirds of computer users in office were suffering from CVS.[3] A couple of studies conducted in Gondar, Ethiopia, reported that more than 73% of computer users who are working as secretaries, data processors, and bankers were developing CVS.[11,12] The present study was thus aimed at assessing the knowledge related to CVS pre- and post-video teaching programme among the medical coding trainee workers.

Subjects and Methods

After getting ethical committee clearance and the institutional permission the cross sectional study was conducted among medical coding trainees working in a private firm between March and August 2018. Universal sampling method was used & the total sample size was 480. A one group pre-test to post-test design (pre-experimental design) was used for this study to assess the effectiveness of video teaching programme regarding computer vision syndrome among medical coding trainees in a selected medical coding institute. Q_1XQ_2 (Q1 – pre-test assessment of existing knowledge, X – Video teaching programme, Q_2 – Post-test assessment of knowledge). A structured questionnaire was prepared based on the objectives of the study after reviewing the literature which had two parts with 1st part containing demographic details, computer usage details, break time while the 2nd part had 25 closed-ended questions to assess the knowledge related to CVS, its causes, signs and symptoms, management and prevention. Medical coding trainees were interviewed using the structured questionnaire. Each correct answer was given a score of one and wrong answer was scored as zero. The total score was 25. Based on the scoring below 50% (12) = Inadequate knowledge, between 50 and 75% (13–19) = moderately adequate knowledge, above 75% (20 and above) = Adequate knowledge were categorized. After obtaining the informed consent from the participants the main study was conducted in which a periodic visit was made to establish the rapport with the study participants. The purpose of the study was explained and after gaining the confidence, introduction of the tool to the medical coding trainees happened. All the participants were assured that findings of the study will not have any impact on their continuation of job. A time limit of 15–30 minutes was taken for each sample for the interview. After the pre-test they were gathered and seated comfortably. The investigator gave the introduction initially followed by a video teaching programme for about 45 minutes using power point presentation and videos. The video teaching programme contained information regarding definition of computer vision syndrome and its causes, signs and symptoms, management and prevention of it. At the end of the video teaching programme 10 minutes was allotted for discussion. The post test was conducted by the investigator after two days using the same structured multiple-choice questionnaire. It was mainly done with a batch of 60 medical coding trainees at a time so that overcrowding and any possible bias was prevented, followed with nine to ten sessions were made to finish the study without any repetitive samples. All the participants in the teaching programme participated with great interest and were cooperative and attentive as adequate privacy was provided during the intervention. Data analysis was performed using Statistical Package for the Social Sciences software for Windows version 21.0 (SPSS Inc., Chicago, IL, USA) values are expressed in frequency with percentage. t test was used as required and $P < 0.05$ was considered significant.

Results

The present study was carried out among 480 medical coding trainees were 368 (76.6%) were females and 112 (23.3%) males. Table 1 shows distribution of the demographic, computer usage details among the study participants. Based on the ophthalmic devices used spectacles. were 104 (21.7%) trainees. On the

Table 1: Distribution of the demographic, computer usage details among the study participants

VARIABLES	GROUPS	Number (480)	Percentage (100%)
Age	20-29 years	296	61.70%
	30-39 years	128	26.70%
	40 years & above	56	11.60%
Level of Education	Undergraduate	216	45%
	Post graduate	240	50%
	Diploma	24	5%
Occupation	Medical coder	152	31.70%
	Trainee coder	200	41.70%
	Executive coder	128	26.60%
Monthly income	Rs 15000-20000	240	50%
	Rs 21000-25000	168	35%
	Rs 26000 and above	72	15%
Years of working in computer	1-2 years	176	36.70%
	2-4 years	184	38.30%
	4 years and above	120	25%
Hours spend per day totally in front of computer	7 hours	152	31.70%
	8 hours	200	41.70%
	9 h and above	128	26.60%
Hours seen computer without break	3 h	200	41.70%
	4 h	168	35%
	5 h	112	23.30%

basis of time of break taken in between the working hours 216 (45%) took 20 minutes break time followed by 192 (40%) took 10 minutes break time with 72 (15%) taking less than 10 minutes break time.

Table 2 shows the pre- and post-test knowledge about CVS among the study participants were inadequate knowledge 280 (58.3%) was majority in the pre-test while adequate level of knowledge about computer vision syndrome was majority 328 (68.3%) in the post-test.

Table 3 shows the overall improvement in knowledge by mean 7.5 and by standard deviation 2.3 with the 't' value of 25.0 which is statistically highly significant difference between the pre-test and post-test level at $P < 0.001$ for all knowledge variables.

Discussion

In our study, 368 (76.6%) were females and 112 (23.3%) were males with the majority age group between 20 and 29 years which was 296 (61.70%) which was similar to study done by Reddy *et al.*[13] in Malaysia with higher female proportion 60.6% and age group ranging from 18 to 25 years. In our study majority 200 (41.70%) showed more than 8 hours of time spent in front of the computer with similar results of more time spent in computer was seen in 51.4% in a study done by Sanchez-Brau M *et al.*[14] where as in contrast 46.60% was found to spend less than 6 hours in front of computer in a study done by Kumar *et al.*[15] among medical college students. Studies have reported that more hours of working in computer has pronounced more visual symptoms and were a significant predictor of CVS.[16] Our present study showed 45% trainees took a break time of 20 minutes and studies had recommended frequent breaks to avoid computer vision syndrome.[13,17]

Our present study shows the knowledge level among the trainees were inadequate in 58.30% with pre-test whereas post-test showed increase in level of knowledge with 68.30% acquiring adequate level of knowledge about computer vision syndrome. Similar results were seen with studies done by Agbonlahor O *et al.*[18] showed 51.6% had previous knowledge of CVS, Chauhan *et al.*[19] showed 65% correctly knew what CVS, Getasew AM *et al.*[20] showed 59.4% having adequate knowledge of computer vision syndrome. Though our study had literates (100%) the level of knowledge about Computer Vision Syndrome was low in the pre-test session similar to studies by Getasew AM *et al.*,[20] Patil A *et al.*[4] suggesting that a serious knowledge gap exists about CVS in the studied population and possibly in the general population.

Table 2: Comparison between the pre-test and post-test knowledge among the study participants

Level of Knowledge	Pre-test		Post-test	
	Number	Percentage	Number	Percentage
Inadequate (0-49%)	280	58.3%	8	1.7%
Moderate (50-75%)	176	36.6%	144	30%
Adequate (76% & above)	24	5%	328	68.3%

Table 3: Effectiveness of Video Teaching Programme on computer vision syndrome among the study participants

Knowledge	Improvement		(*t*)	Level of significance (*P*)
	Mean	Standard deviation		
Overall knowledge	7.5	2.3	25.0	0.001**

**Statistically significant

Based on the pre-test knowledge about CVS among the study participants inadequate knowledge was seen in 280 (58.3%), moderate knowledge in 36.6% and adequate knowledge in 5%. The post test phase showed adequate level of knowledge about computer vision syndrome as majority 328 (68.3%), moderate knowledge 30% and inadequate knowledge with regards to CVS reduced down to meagre 1.7%. The knowledge level about CVS increased post teaching session which was statistically significant too, highlighting the need for such health education activities among the employees so that they can differentiate their ocular disturbances, headache symptoms. From a primary care point of view, knowledge regarding CVS helps in differentiating and addressing the ocular symptoms, headache and shoulder pain symptoms of other aetiology if history is elicited properly with regards to electronic devices/computer usage and not ignoring it as a simple dry eye, eye strain, and headache.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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