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Prevalence of Self Reported Computer Vision Syndrome and Associated Factors among Secretaries and Data Processors Who are Working in University of Gondar, Ethiopia

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Abstract
Computers have become an indispensible part of modern life, being used in every aspect of life. This technological advancement has ushered in a new genre of occupational health problem. Computer Vision Syndrome is a condition that affects millions of people globally. This study investigated the prevalence of Self Reported Computer Vision Syndrome (CVS) and associated factors among secretaries and data processors who are working in university of Gondar, Ethiopia. This institution based cross sectional study was based on 284 study participants from the 1st May to 15th June 2004. Descriptive statistics and logistic regression was used to estimate odds ratio and 95% confidence interval. The prevalence of Computer Vision Syndrome among respondents was 73.9%. Secretaries and data processers used computers for > 7 hours per-day were 2 times more likely to have suffered from CVS as compared to those who used computers ≤ 7 hours per-day (OR=2; 95%CI: 1.14 – 3.51). Prevalence of CVS was high among the study participants. Age and working hours spent on computer use are independent predictors of CVS. Further studies on a large scale should be carried out to explore the extent and factors associated with CVS.
Keywords: Computer Vision Syndrome, University of Gondar, Working hour's per-day

1. Introduction

Computer has become almost an indispensable piece of equipment both at office and at home. The introduction of computer no doubts has revolutionized and benefited the society; however it does associate with 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 (Griffiths KL, et al, 2007). More recently, visual and ocular problems are reported as the most frequently occurring health problems among computer users (Collin MJ, et al. 1988).

The computer has become a part of the everyday life at present. Computer Vision Syndrome often results from working on computers for over 8-16 hours. Computer Vision Syndrome can also be presented with symptoms of eyes soreness, redness, fatigue, headaches, burning, glare sensitivity, contact lens discomfort, double vision and periodic blurring of near and distant vision. Computer Vision Syndrome is common ailment in majority of people who continuously use laptops, mobile Internet and other technology gadgets that strain the eye. Over 75% of young software professionals and college students in India's IT capital of Bangalore are reportedly face the Computer Vision Syndrome (Dr.umesh, 2010). In the world it has been estimated that nearly 60 million people experience vision problems as a result of computer use. This computer related ocular condition is called Computer Vision Syndrome (CVS). Millions of new cases occur each year (Samna Wimalasundera, 2006).

Increased use of computers has led to an increase in the number of patients with ocular complaints which are being grouped together as Computer Vision Syndrome (CVS). This newfound entity, frequently mentioned in the World Wide Web and the lay press, is now being accepted in medical literature (Grand AH, 1987; Watt WS, 2005). The Occupational Safety and Health Administration department of the US Govt. (OSHA) has defined CVS as a "complex of eye and vision problems that are experienced during the related to computer use; it is a repetitive strain disorder that appears to be growing rapidly, with some studies estimating that 90% of the 70 million U.S workers using computers for more than three hours per day experience CVS in some form" (Nilsen R. 2005).

Computer users are generally encouraged; this is to keep up with the fast moving world of technology, research and science. Researchers have come to an agreement that this could actually be harmful, if not properly managed for future generation (Nunoo M. 1996). Accordingly, the aim of this investigation was to examine the prevalence of Self Reported Computer Vision Syndrome (CVS) and associated factors among secretaries and data processors who are working in university of Gondar, Ethiopia.

2. Materials and Methods

Institution based cross sectional study design was employed to assess the prevalence of self reported computer vision syndrome and associated factors. Collected detail primary data through questionnaires from 284 secretaries and data processors from the 1st May to 15th June, 2014. The study was conducted in University of Gondar. University of Gondar is found in the oldest and historical place of Gondar, Northwestern Ethiopia, located 737km far from Addis Ababa, the capital city of Ethiopia and 173km far from the regional city of Amhara, Bahir dar.

2.1. Operational definitions

Self Reported Computer Vision Syndrome – reported by his/r own one of the eye problems listed below. Eyestrain, blurred vision, headache, dry eye, watery eye, blurred vision, double vision and irritation of the eyes that occur as a result of computer use (Chiemeke, SC, 2007).

Secretaries and Data Processing Workers: - are workers whose work is primarily based on computer use.

The data was collected using pretested standardized questionnaire that assess the level of the eye problems and associated factors among the study participants. The data was collected by the principal investigator on the appropriate time planed in the work plan. The completed instruments were checked at the end of each day for omissions, incomplete answers and unclear statements. Data was collected for a period of three weeks. The questionnaires were collected immediately after completion.

Data clean up and cross–checking was done before analysis. Ethical clearance was obtained from the Institutional Review Board of School of Public Health, College of Medicine and Health Sciences, University of Gondar. The purpose of the study was clearly explained to the study subjects and their verbal consent was obtained. Confidentiality of the data was strictly maintained throughout the study period.

The data were entered and analyzed by SPSS version 15.0 statistical software (SPSS Inc. Chicago, 2007). Bivariate and multivariate logistic regression analyses were used to identify factors associated with computer vision syndrome. The unadjusted (crude) (COR) and adjusted odds ratios (AOR) together with their corresponding 95% confidence intervals (CI) were computed. A p–value ≤ 0.05 was considered statistically significant in this study. Efforts were made to assess whether the necessary assumptions for the application of multiple logistic regression were fulfilled. In this regard, the Hoshmer and Lemeshow's goodness– of –fit test was considered where a good fit will yield a large p – value.

3. Result

A total of 284 secretaries and data processing worker's were included with an overall response rate of 100%. The majority of the study participants 205(72.2%) were females and the rest 79(27.8%) were males. The mean ($\pm$ SD) of the study participants was 28.90 ($\pm$ 7.08) years. About eighty four percent (83.8%) of the study participants were Amahara by ethnicity and 85.2% were orthodox Christians by religion. Thirty nine point eight percent of the study participants were learned to the level of degree and 37.3% had diploma certificate. Regarding marital status of the study participants, 46.8% of them were single, 48.6% of them were married and 2.5% of them were divorced. More than half (51.4%) of the respondents spend more than seven hours per-day working on the computer. (Table - 1)

Seventy three point nine percent (73.9%) of the study participants were found to suffer from computer vision syndrome. The symptoms most experienced by study participants are blurred vision (31%) and eye strain (25%). The rest symptoms were headache (22.2%), redness of eyes (20.1%), watery eyes (19.4%), dryness of eyes (13.4%), double vision (8.8%), and eye irritation were found to be 7.7%. (Fig.1)

In the Bivariate analysis age, total years of work on the computer and working hours in the computer per-day are significantly associated with computer vision syndrome. (Table – 2),

The multivariate analysis was used to identify characteristics that were predictive of computer vision syndrome. Age and working hours in the computer per-day are independently associated factors for computer vision syndrome (Table - 2).

4. Discussion

This study focused on determining the prevalence of CVS and associated factors. As a result, 73.9% of the study participants were found to suffer from CVS. This is in line with the study done in Abuja, Nigeria it was 74% CVS in their study population (T.R. Akinbinu et al., 2013). In addition to this, the most experienced symptoms in this study were blurred vision and eye strain which accounted 31% and 25% respectively. Other symptoms reported were headache (22.2%), redness of eyes (20.1%), watery eyes (19.4%), dryness of eyes (13.4%), double vision (8.8%), and eye irritation were found to be 7.7%. Our findings are in agreement with the report by T.R. Akinbinu et al., (2013) and Bail et al., (2007) who reported eye strain and headache as chief presenting symptoms of CVS in their study population. Similarly, the findings in this study concur with the findings by Chiemeke et al. (2007) who reported eyestrain as being the most common visual symptom experienced by computer users. They also reported blurred distance vision, headache, double vision and redness of eyes as other

common visual symptoms associated with computer use.

Those secretaries and data processors who are in the age range between 26-35 and those who are greater than or equal to 36 (≥ 36) were two times (AOR = 2.61; 95%CI = 1.37-4.97) and seven times (AOR=7.45; 95%CI=2.20-25.18) more likely to develop CVS when compared to those whose age is less than equal to 25 (≤25) respectively. This might be explained by the practice of preventive mechanisms of eye problems in the study participant were poor. Therefore, older age secretaries and data processors were at higher risk of developing CVS.

Secretaries and data processers used computers for > 7 hours per-day were 2 times more likely to have suffered from CVS as compared to those who used computers < 7 hours per-day (OR=2; 95%CI: 1.14 – 3.51). In other studies, an increase in the number of hours spent on computer increases the risk of CVS significantly. (M. Logaraj et al., 2014) In addition to this, other studies revealed that visual symptoms increased with the increase in working hours on the computer. (Shrivastava SR et al., 2012) Rahman and Sanip, in their study reported that those respondents who used computer for more than 5 hours per-day were at higher risk of developing CVS. (Rahman ZA et al., 2011) previous studies have also shown that computer users at increased risk of having such visual symptoms. (Rajeev A et al., 2006; Sharma AK et al., 2006)

CVS has been classified as the number one occupational hazard of the 21st Century (Torrey, 2003). This observation cannot be overemphasized when considering the upsurge in information technology, proliferation of computer systems, dependency on the computer for daily operations and occurrence of CVS among employees. It is so now, because in 2000 it was reported that more than 75% of daily activities of all jobs involve the use of the computer (Ihemedu et al., 2010).

CVS significantly impairs workplace productivity and reduces the quality of life by placing unusual strain on the human physical well-being. Unfortunately, in this study some important variables like total years of work on the computer, using computer eye glass, use of antiglare screen and adjustment of the brightness of the computer were not significantly associated with CVS. This might be partly explained by the sample size for those predictor variables were not adequate. It is recommended that further studies be carried out on a large scale to determine the extent of the CVS problem among employees at workplaces including schools, colleges, higher education institutions, government departments and the private sector in Ethiopia. It is envisaged that such evidence-based information will be used by stakeholders to raise awareness about CVS among the workforce and for designing intervention strategies to reduce the impact of CVS at workplaces.

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Ethical approval

Ethical clearance was obtained from the Institute Review Board of Institute of Public Health, College of Medicine and Health Sciences, University of Gondar. The purpose of the study was clearly explained to the study subjects and their verbal consent was obtained.

Competing Interest

None declared.

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Table – 1
Socio–demographic characteristics of secretaries and data processors in University of Gondar, Ethiopia

Variable		Frequency	Percentage (%)
Sex	Male	79	27.8
	Female	205	72.2
Age	<=25	110	38.7
	26-35	122	43.0
	>=36	52	18.3
Religion	Orthodox	242	85.2
	Muslim	26	9.2
	Protestant	14	4.9
	others	2	0.7
Ethnicity	Amhara	238	83.8
	Oromo	13	4.6
	Tigrie	22	7.7
	Others	11	3.9
Marital status	Single	133	46.8
	Married	138	48.6
	Divorced	7	2.5
	Widowed	3	1.1
	Separated	3	1.1
Educational status	primary education	8	2.8
	secondary education	24	8.5
	diploma	106	37.3
	degree	113	39.8
	masters	32	11.3
	PhD	1	.4
	Total	284	100.0
Average hours spent on computer daily	≤7	138	48.6
	>7	146	51.4
Duration of computer use	**≤7**	191	67.3
	>7	93	32.7
Income	<=1500	129	45.4
	2500-3000	102	35.9
	>=3001	53	18.7

Fig – 1
Frequency of computer vision syndrome reported from secretaries and data processors in University of Gondar, Ethiopia

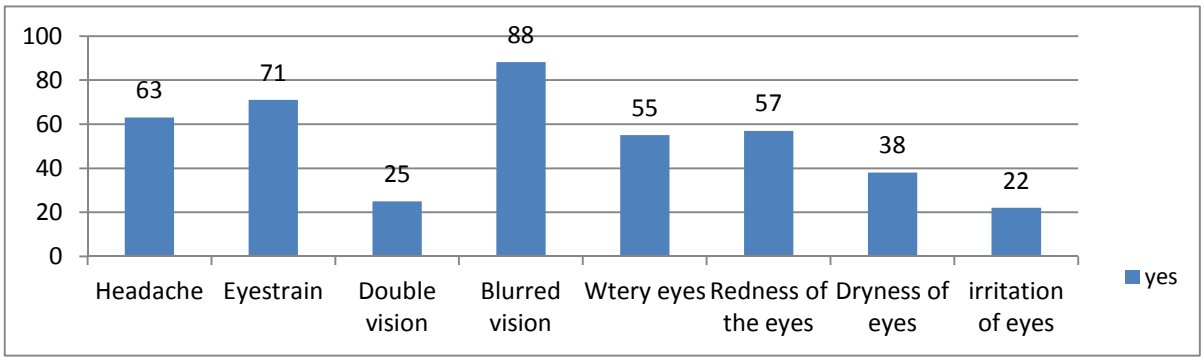

Table – 2
Factors affecting computer vision syndrome among secretaries and data processors in University of Gondar, Ethiopia

variables		CVS		COR(95%CI)	AOR(95% CI)
		yes	no		
age	<=25	67	43	r	R
	26-35	96	26	2.37[1.33,4.23]	2.61[1.37,4.97]*
	>=36	47	5	6.03[2.22,16.37]	7.45[2.20,25.18]*
Total years of work on the computer	<=7	93	45	r	R
	>7	117	29	2.09[1.13-3.90]	0.78[0.35-1.73]
Working hours in computer per day	<=7	133	58	r	R
	>7	77	16	1.95[1.40-3.35]	2.0[1.14-3.51]*
Previous eye problem	yes	16	1	6.02[0.78,46.23]	
	no	194	73	r	
Have computer eyeglass	yes	12	4	r	
	no	198	70	0.94[.29, 3.02]	
Use of antiglare screen	yes	3	1	r	
	no	207	73	0.59[0.22,1.61]	
Adjustment of the brightness	Yes	49	17	r	
	No	161	57	0.98[0.52,1.84]	
Position of computer	below	42	14	r	
	Parallel + above	168	60	0.933[0.48, 1.83]	
Windows position	At the side	75	26	r	
	Back and front	135	48	0.97[0.56, 1.69]	

*statistically significant; r = reference

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Keywords: computer vision syndrome, computer users, bank workers, Gondar. Introduction.Â Alemayehu M, Nega A, Tegegne E, Mule Y. Prevalence of self reported computer vision syndrome and associated factors among secretaries and data processors. J Biol Agric Healthc. 2014;4(15):2224â€“3208.Â Computer vision syndrome: a study of knowledge and practices in university students. Nepal J Ophthalmol 2013;5(10):161â€“168. 18. Logaraj M, Madhupriya V, Hegde S. Computer vision syndrome and associated factors among medical and engineering students in Chennai. Ann Med Health Sci Res. 2014;4(2):179â€“185. Health Care Personnel who are working in the office and not potentially exposed for HIV risky conditions (Pharmacy, Admission Officers, Radiographer and Environmental Health) were excluded. Sample size. The sample size was determined using single proportion formula n=(Z Î± / 2)2 P (1-p)/d2 and by considering the following assumptions: 95% CI, Where, Z Î± /2=1.96.Â Data collection methods and instrument. Self-administered structured questionnaire was developed in order to collect the study data from participants. The questionnaire consists of five parts; which include socio-demographic, knowledge, attitude, practice and associated factors questions [23]. Data analysis and management.