



## Prevalence and Associated Factors Related to Computer Vision Syndrome among Bank Employees in Peshawar

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**Abstract:** Computers are vital, but in banking, they are essential. Long-term computer screen exposure harms the eyes. This study examined CVS prevalence and associated variables in Peshawar City Bank employees. This descriptive-analytical investigation was done across Peshawar city. Commuter bankers were the study population. This multistage study attracted 289 people. A complete tailored questionnaire using SPSS version 24 analyses collected data. Time exposure and CVS were examined. The chi-square test determined significance. A sample of 289 bank workers (mean age  $32.72 \pm 7.02$  years) included 266 (92.0%) men and 23 (8.0%) women. 24.2% of employees had yes illnesses and 77.2% had CVS. Most of them had simple eye health issues due to computer screen overexposure. These symptoms included eye strain, pain, headache (68.9%), blurriness (67.5%), dryness (49.1%), blinking (46.7%), redness and irritations (44.3%). The prevalence of diagnosed eye diseases was high at 24.2% while CVS was positive in 77.2% for at least one symptom.

**Key Words:** Prevalence, Computer Vision Syndrome, Ophthalmology, Bank Employees

### Introduction

In the current century, technology has completely transformed the workplace, with over half of office workers now using computers which have significantly increased work efficiency (1). The advancement of technology and communication science technologies has changed the way people operate. In developed countries, 71% of those who are employed or self-employed use computers and the Internet daily. Employees spend most of their time in front of visual displays of electronic devices such as computers, laptops, smartphones, and tablets, which produces eye strain (2). Many of our

children are also affected by the overuse of electronic devices with visual displays for playing games, text messaging on mobiles, and also completing their school homework in the modern era (3). Images and words on computer screens display small points of light called pixels, which are dull at the edges, and glowing towards the centre, making it hard for the human eye to keep up focus. Although technology has made the job very quick and easy, they have also introduced new health-related issues. Long-time exposure to light in certain occupations would be risky for the eyes' visual function (4). Anyone who works on a computer for an extended period each day is

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susceptible to vision issues. The term "computer vision syndrome (CVS)," sometimes known as "digital eye strain," describes the visual and ocular symptoms that some people have after reading textual content that has been electronically presented on an IT application. (5). CVS is nowadays a major public health problem due to the increased use of electronic devices (6).

Optometric Association of America (OAoA) explains CVS as a "group of vision or eye related problems that are the outcome of prolong or overuse of computers, tablets or cell phone" (7). Eyestrain, headaches, blurred vision, dry eyes, and neck and shoulder pain are the symptoms of CVS that are most frequently reported. It is unclear why some people have these symptoms. Some academics claim that reading text presented on IT applications requires more effort from the eyes than reading text displayed on more conventional media, such as printed paper (8). The incidence of CVS is most common among computer users comprising bankers, clerks, software professionals, gamers, and IT professionals, physicians. Among medical professionals, radiologists are the most vulnerable group due to the distinctive nature of their job (9). Prolong uses of digital electronic devices and computers are the main cause of CVS. According to The American Optometrists Association, 10 million per year eye examinations were done by optometrists for visual problems due to computer use (10).

Symptoms of CVS vary from blurred vision, dryness of eyes, neck and shoulder pain, eye pain, and headaches. Symptoms that develop due to CVS are temporary and fixed when you leave the computer screen and rest for some time. Factors enhancing the symptom's maturity and severity include room illumination, the brightness of the screen, posture and distance from the screen, etc. Despite being easily preventable, about 60 million people in the world suffer from symptoms of CVS and every year 1 million new cases are reported. People using computers mostly complain about

the occurrence of tiredness which is very much common in every country nowadays (11). Symptoms of CVS mostly occur from poor lighting, reflection on screen as well as improper distance of view, uncorrected vision problems, poor posture, or a combination of these factors. (12) A complete eye examination is required to evaluate CVS which shall consist of working history, medication use, various general health problems, or any environmental factors that come up with eye strain. Adding, a refraction test, visual acuity, and how the eye will focus well, move and work together is needed. (13) The current study aimed to determine the prevalence and associated factors related to Computer vision syndrome among bank employees in Peshawar.

## **Material and Methods**

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This was a Descriptive analytical study to find the prevalence and associated factors of complex eye problems in bank workers in major banks in Peshawar including; MCB, ABL, and UBL from 1<sup>st</sup> February to 31 July 2022. The calculated samples were 289 participants assuming  $p= 0.75$ ,  $d=0.05$ , and  $1-\alpha$ . A multistage random sampling technique was used to select participants from Banks. A two stages strategy was used to select the final study participants. In the first stage, the areas (hubs) where at least ten banks were available were identified. Then 50% of these clusters were selected randomly. There are four towns in Peshawar and in each town, we had two areas where at least 10 banks were available at Sadar areas, Qisa Khuwani bazar, Hashtnagri to haji camp, Gul bahar, Dalazak Road, University town, Hayatabad and Ring road Peshawar. So considering that 50% of cluster areas were selected randomly. In the second phase, all those who are using the computers were recruited in the study using census techniques. The subjects of either gender and candidates spending more than 6hrs of time before computer screens regardless of having symptoms of computer vision syndrome were included in the study while candidates with a

known case of eye and vision problem other than CVS, were not willing to participate, wearing glasses for eyesight problems or using medication for eye symptoms were excluded from the study.

The data collection tool was a comprehensive adapted questionnaire consisting of a total of 15 Questions. Reverse scoring was done. After approval from the university's AS&RB and the ethics committee, permission from the bank administration was taken. After taking the informed consent (verbal and written), data were collected. The participants were ensured of the confidentiality and anonymity of the data. They were having the right to withdraw from the study at any stage of the data collection. The participants were encouraged to fill in the questionnaire on the spot, as to avoid any chance of filling in using help from any reference sources. The collected data were tabulated into an MS Office Excel Sheet and a chi-square test was applied for determining the difference between the groups. The data were then analyzed statistically using IBM SPSS v23.0.

## **Results**

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The majority of the subjects were male i.e., 266 (92.0%) and 23 (8.0%) were female with a mean age of  $32.72 \pm 7.02$  (ranging from 21 – 58) years. The study population comprised; General Managers, Acting Branch Managers, Associate Managers, Branch Services Officers, Business dealers, Cash Officers, Cluster Managers, Computer Operators, Coordinators, Customer service representatives, Internal control monitoring officers, IT web developers, Operation managers, Personal Banking Officers, Relationship managers and Service Ambassadors. Among the participants, the majority were from Askari Bank 47 (16.3%) followed by Allied Bank 37 (12.8%), BOP 31 (10.7%), Meezan Bank 27 (9.3%), Soneri Bank 25 (8.7%), Bank Islamic 22 (7.6%), Bank of Khyber 27 (9.3%), MCB Bank 16 (5.5%), UBL 16 (5.5%), Faisal Bank 12 (4.2%), Sindh

Bank 10(3.5%) Faysal Bank 7 (2.4%), HBL Bank 6 (2.1%), JS Bank 6 (2.1%). Regarding the locations of these banks, the majority 71(24.6) were from City areas of Peshawar followed by University Town 65(22.5%), Saddar Bazar Peshawar 39(13.5%) Cantt Region 36 (12.5%). The mean time since they started using the computer was  $9.08 \pm 5.8$  (ranging from 1-30) years while the mean time/day exposure to screen was  $7.13 \pm 2.717$  (ranging from 2 – 15) years. The results show that 70 (24.2%) were having eye problems diagnosed during the last years while 219 (75.8%) had no apparent diagnosed case. However, most of them had simple adverse symptoms associated with eye health, which may be probably due to overexposure to computer screens. Results indicate that pain in and around the eyes was reported by 237 (82.0%) of computer users and 199 (68.9%) had a headache. Blurred near vision was prevalent among 195 (67.5%) and Irritated/dry/red eyes excessive tearing was observed in 142 (49.1%) of the bank employees. Other symptoms included changes in visualizing colour and it was found in 135 (46.7%) while Twitching of eyelids was reported by 128 (44.3%). These findings were totally based on clinical assessment of the eye during the data collection. The eye was physically assessed by the principal investigator's clinical basement. The results in this regard revealed that 223 (77.2%) were positive for one or more symptoms while 66 (22.8%) were negative. Health problems other than the eye were also explored and the result indicates 249 (86.2%) of them had neck pain and 40 (13.8%) were free from these signs. Similarly, nearly 230 (79.6%) bank employees experienced shoulder pain while using the computer. This condition was aggravated among those who used the computer in the office as well as at home as 181 (62.6%) participants also work on the computer at home. Only 108 (37.4%) were not using a computer other than a workstation. Among bank, employees who participated in this study 149 (51.6%) were not wearing any glasses

while working at the computer. The outcome in terms of deterioration in driving/night vision 159 (55.0%) said that the use of a computer has any effect on their Driving/Night vision. The outcomes of eye health and other health consequence may also be associated with the type of computer (Desktop or laptop) used in the office and house. In this regard, 242 (83.7%) used desktops and only 47 (16.3%).

Regarding the average time spent in front of the computer screen, results indicate that the majority 218 (75.4%) were working on a screen for more than 05 Hrs. and 24.6% worked for 1-4 hours. The distance between the eye to work material was asked and the finding indicates that 216 (74.7%) of computer users usually have a distance of 2 ft between the eye and reading material while 43 (14.9%) were keeping 3 feet distance and 30 (10.4%) had 4 feet distance. The disease prevalence

increased with an increase in the time of exposure to the computer screen (Table 1). The results indicate that eye problem in terms of blurred near vision was 49 (25.1%) as compared to 46 (48.9%). It was 86 (44.1%) as compared to 22 (23.4%) during the six to 10 years of exposure. ( $p=0.0001$ ) (Table 2). Irritated/dry/red eyes excessive tearing was high during 6-10 years of work on the computer screen. The difference is neither linear nor statistically significant ( $P=1.44$ ). Similarly, changes in visualizing colour were 64 (47.4%) as compared to 44 (28.6%) of a normal in-effected eye ( $p=0.01$ ). Twitching of eyelids during ear years (1-5 years) of work was 31 (24.2%), while it increased to 62 (48.4%) during 6-10 years of work on a computer and 26 (20.3%) during 11-15 years of experiences (Table 3).

**Table 1**

*Comparison of Exposure time with Eye Diseases*

Exposure time	Diagnosed Eye Disease		P-Value
	Positive	Negative	
1-5 years	11 (15.7%)	84 (38.4%)	0.001
6-10 years	26 (37.1%)	82 (37.4%)	
11-15 years	21 (30.0%)	33 (15.1%)	
16-20 Years	7 (10.0%)	10 (4.6%)	
21 and above	5 (7.1%)	10(4.6%)	
N	70	219	

**Table 1**

*Comparison of Exposure Time and MSK Symptoms*

	Eye Problems		P-Value
	Yes	No	
<b>Pain in and around the eyes</b>			
1-5 years	76 (32.1%)	19 (36.5%)	0.09
6-10 years	95 (40.1%)	13 (25.0%)	
11-15 years	40 (16.9%)	14 (26.9%)	
16-20 Years	12 (5.1%)	5 (9.6%)	
21 and above	14 (5.9%)	1 (1.9%)	
<b>Headache</b>			
1-5 years	76 (38.2%)	19 (21.1%)	0.0001
6-10 years	80 (40.2%)	28 (31.1%)	
11-15 years	26 (13.1%)	28 (31.1%)	

16-20 Years	10 (5.0%)	7 (7.8%)	
21 and above	7 (3.5%)	8 (8.9%)	
<b>Blurred near vision</b>			
1-5 years	49 (25.1%)	46 (48.9%)	
6-10 years	86 (44.1%)	22 (23.4%)	
11-15 years	35 (17.9%)	19 (20.2%)	0.0001
16-20 Years	13 (6.7%)	4 (4.3%)	
21 and above	12 (6.2%)	3 (3.2%)	

Table 2

*Comparison of Exposure Time and CVS Symptoms*

	Eye Problems		P-Value
	Yes	No	
<b>Irritated/dry/red eyes excessive tearing</b>			
1-5 years	39 (27.5%)	56 (38.1%)	
6-10 years	61 (43.0%)	47 (32.0%)	
11-15 years	27 (19.0%)	27 (18.4%)	0.144
16-20 Years	6 (4.2%)	11 (7.5%)	
21 and above	9 (6.3%)	6 (4.1%)	
<b>Changes in visualizing colour</b>			
1-5 years	37 (27.4%)	58 (37.7%)	
6-10 years	64 (47.4%)	44 (28.6%)	
11-15 years	18 (13.3%)	36 (23.4%)	0.01
16-20 Years	8 (5.9%)	9 (5.8%)	
21 and above	8 (5.9%)	7 (4.5%)	
<b>Twitching of eyelids</b>			
1-5 years	31 (24.2%)	64 (39.8%)	
6-10 years	62 (48.4%)	46 (28.6%)	
11-15 years	26 (20.3%)	28 (17.4%)	0.0001
16-20 Years	2 (1.6%)	15 (9.3%)	
21 and above	7 (5.5%)	8 (5.0%)	

## Discussion

Computer screen exposure is among one of the top significant risk factors leading to a number of eye-related adverse health outcomes. Bank staff are at risk of this problem due to long-term exposure to the computer screen. This study was conducted to ascertain the extent of eye problems associated with long-time use/exposure to computer screens among bank employees in Peshawar City.

Previously, a study on students as computer users was carried out where the time duration of screen exposure was investigated for eye health outcomes. The results indicate

that screen exposure in the first year of life was shown to be substantially linked to an elevated risk of developing astigmatism with the risk peaking 3.1 times during the first year. Both the overall number of years of exposure and the typical daily screen exposure time was associated with an elevated risk of astigmatism. (14) A study on the general population in Bangladesh, indicate that the over-prevalence of vision problems was 92.8%. Among the common disease, refractive error (RE) was found in 63.20% of the population followed by 17.10% viral (conjunctivitis) and 16.40% visual problems, cataracts were the least prevalent and it accounted for only 7.20%. (15) Our

results show that 237 (82.0%) computer users experienced eye discomfort, compared to 199 (68.9%) who reported headaches. Among 195 (67.5%), blurred near vision was common, and 142 (49.1%) of the bank employees had irritated, dry, or red eyes. Other symptoms included altered colour perception, which was observed in 135 (46.7%) cases, and eyelid twitching, which was reported in 128 (44.3%) cases. A similar study on university students who were continuously using the computer was conducted. The results revealed that 53.3% of computer users experienced visual issues and headache, burning eyes was reported by 54.8% while weary eyes were found in 48%. It was shown females were more at risk of developing eye problems as compared to male computer users. Nearly 72% of the participants claimed that their computer work was frequently interrupted. 43.85% of them reported work interruptions due to headaches, whereas 43.5% said that the interruption was due to weary eye problems. The prevalence of headaches dropped by 38% when the screen was seen from a distance greater than 50 cm. When screen filters were not utilized, the prevalence of sleepy eyes rose by 89% respectively. (16)

The results after clinical assessment of the eye of the participants showed that 66 (22.8%) were currently negative whereas 223 (77.2%) were positive for one or more symptoms. In addition to the amount of time spent using the desktop, eye & eyesight issues are also related to bad lighting, reflection, illumination variation, vision issues, and unsuitable workstation layout. (17) Long-term use of electronic display systems has also been linked to the McCollough phenomenon, a temporary visual anomaly that causes black-and-white things to seem coloured. (18) Another study about CVS from Nigeria indicates that headache was common at 61.4%, symptoms and affected followed by eye strain at 57.8%, and blurred vision at 50.6%. The length of time spent using a computer, the number of hours used daily, the height of the computer screen, and taking

breaks while using a computer were risk variables that were strongly linked to CVS in this study. At least one CVS symptom was present in around half of the research participants. (19) In the current study, the findings show that 86.2% of the participants experienced neck discomfort and 13.8% were free of these symptoms. Similarly, when using the computer, over 79.6% of bank employees reported shoulder discomfort. Those who utilized computers at work as well as at home had an aggravation of this disease and 62.6% of them responded that they do so at home as well. Only 37.4% of people did not use a computer except a workstation. 51.6% of bank employees who took part in the research were using glasses while using a computer. Results from another study also demonstrated that extended computer users, including workers and students, frequently experience repetitive strain injury, stress, vision disorders, and muscular-skeletal diseases. Carpal tunnel syndrome, stress, machine vision dysfunction, and muscular-skeletal problems are more common among workers than in students or people who work and go to school. (20) According to data from the UK based on the general population aged 18 to 75, the incidence of neck discomfort during a 12-month period was 17.90%. A six-month incidence of eye problems among computer users varies from 23.5% to 34.4% on an annual basis. (21) In one research, the fortnightly proportion of neck and shoulder discomfort in teenagers grew from 17 to 28%. The authors think that this was due to adolescents becoming more sedentary, notably via increasing computer use. Similarly, another study showed that the incidence of neck discomfort in office employees over the course of a year ranged from 17.70%-63.0% (22).

The disease prevalence increased with an increase in the time of exposure to the computer screen. Results indicate that the prevalence of eye diseases was 15.7% among those with experiences of 1-5 years. There was a steady increase in prevalence and the highest 30.0% was noted among participants with 11-

15 years of exposure/experience. This difference was statistically significant ( $P < 0.001$ ). The prevalence of dry eye was 59.0% with severe symptoms. They also suffered from poor performance, having trouble concentrating at work, compared to 17.1% of people with mild and 22.7% with moderate dryness. According to these results, productivity dramatically declines as dry eyes become more severe. In comparison to those with moderate 6.1% and mild 7.1%, it is further reported that 35.8% of participants with severe eye problems reported considerably more impaired work hours per week. (23)

Comparison of Eye problems/symptoms with respect to time of exposure eye pain was widespread in 76.1% at the early phase of computer exposure, but it grew to 95.1% over the course of an additional 4 years. However, the P-value ( $p=0.09$ ) indicates that the difference is not significant. It is further observed that 25.1% of bank employees had blurred vision. ( $p=0.0001$ ). The overall prevalence of complex symptoms in terms of CVS was 73.0% where 42.4% had blurriness and, 23.0% with a headache. Eye redness was found in 23.0%. These symptoms were associated with unhealthy posture and time duration of computer usage. Break at different intervals was a predictor of safety and it prevent tearing, similarly, those wearing glasses for eyesight were more at risk of developing eye symptoms as compared to individuals wearing glasses. About 3/4<sup>th</sup> of the bank's employees had complex eye problems, with headache, blurred vision, and red eyes being the most common symptoms. Using spectacles and seating in the proper position while using the computer for a longer time were separately linked to the development of eye problems. (24) Overbearing caused by itchy, dry, or red eyes

was prevalent when using a computer for six to ten years. Both the difference and the statistical significance are not linear ( $P=1.44$ ). The alterations in colour perception were 47.4% as compared to 28.6% of the normal affected eye ( $p=0.01$ ). Eyelid twitching was 24.2% during the first five years of employment, 48.4% during the six to ten years of computer employment, and 20.3% throughout the eleven to fifteen years of experience. A similar study based on 150 bank employees was investigated for CVS, having a mean age of  $33.2 \pm 7.2$  years. Each participant regularly used a computer. 1–16 hours each day were spent on computers. Out of the 53.4% who were aware of CVS, 84.7% of them implemented preventative measures such as computer screen protectors 22.3% and anti-reflective eyewear was used by 12.7%. However, still, 68.7% of them were experiencing symptoms when using a computer. The common signs and symptoms of CVS were reported by 29.3% of bank employees. The most frequent symptoms were headache itching photophobia, visual blur and eye aches were found in 45.4%, 38.6%, 38.0%, 37.3%, and 28.0% respectively. There was a tendency for CVS to be more prevalent in females ( $P = 0.059$ ), with extended computer use and disregard for preventative measures. The risk of CVS is six times higher in people who use corrective glasses. (25)

## **Conclusion**

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The over-prevalence of the diagnosed eye disease was quite high compared to the prevalence, reported in the general population. Wearing eyeglasses and sitting in the proper position while using the computer for longer than 20 minutes may reduce the onset of computer vision syndrome.

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