THE PROGNOSIS IN THE TREATMENT OF COMPUTER VISION SYNDROME

Abstract

Introduction: Computer vision syndrome (CVS) refers to a collection of vision-related symptoms that stem from prolonged usage of digital display devices like computers, tablets, and smartphones. Today's students have convenient access to online resources and e-books via their smartphones, decreasing reliance on traditional printed materials. The use of computers is generally encouraged as it aligns with the fast-paced landscape of technology, research, and science. However, the widespread adoption of computers has led to a significant surge in the incidence of computer vision syndrome (CVS), resulting in various eye-related symptoms. This study aims to evaluate the prevalence and risk factors associated with CVS among IT professionals at AVMC HOSPITAL.

Materials and methods: This study follows an observational, descriptive cross-sectional research design. The research involved participants from AVMC graduate school faculty, various departments, and IT majors who were requested to fill out an electronic self-administered survey. The survey questionnaire covered a range of topics, including demographic details, digital device usage patterns, the frequency of eye-related symptoms, and ergonomic practices. Notably, the research found that CVS symptoms were notably more prevalent among female students, individuals who regularly checked their screen reflections, and those who wore eyeglasses. Surprisingly, an extended duration of device usage did not exhibit a significant correlation with an increase in CVS symptoms. Furthermore, it was

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observed that a majority of students tended not to adhere to ergonomic practices, indicating the need for increased efforts in promoting the correct utilization of equipment to enhance awareness.

Key Words: Associated factors, Computer use, Computer vision syndrome, Dry eye, IT Professions

I. INTRODUCTION

Many laptop customers have Computer Vision Syndrome (CVS). The problem seems even bigger if you are doing satisfactory work like photo folding business of customer, warehouse store. Research or supplements on lifestyle coverage and other online work that needs more Research shows that 50-90% of laptop customers enjoy CVS brands. The good news is that attention and vision symptoms and CVS problems can usually be alleviated with excellent vision care and/or changes in the work environment. It does not block their patients for life. Most punctuation marks disappear after a few hours away from the keyboard. Human aging is the biggest problem for the imagination and foresight of the laptop. Problems appear with the usual deterioration of the vision at the age of 40 years. But it also affects young men and women whose exposure is too high. There is no evidence that using computers causes constant eye strain; however, they can make people so uncomfortable that they can lose focus on their work.

A Number of Workplace Factors Can Lead To CVS:

- Bad attitude towards the computer;
- Light that causes glare or reflections, blurry images or images that are too dim or bright;
- Failure to moisten the surface of the eyes with sufficient frequency;
- Using corrective lenses that are not suitable for the user's position and distance from the screen;
- Small visual errors that can go unnoticed if they are not exaggerated during intensive use of the computer.

1. **Short Term Effects:** Dry eyes, blurred vision, eye fatigue, excessive tearing.

- **Long-Term Effects:** Migraines, cataracts, and visual epilepsy.

Cause

- When using a computer, people typically blink less, even though blinking is important to maintain comfortable, moist eyes. Reduced blinking results in dry eyes and excessive evaporation.

- Additionally, some persons experience mild difficulties with eye coordination and focus that don't show up when engaging in other activities but become problematic when using a computer.

- Computers are often set up in ways that make eyes work too hard.
  - i)The computer typeface may be too small
  - ii) The glare from nearby lights or windows may be too bright
  - iii) The monitor may be placed higher than is natural for your eyes.

- People over 40 with bifocals or reading glasses often run into problems because their glasses are geared to looking at books held 16 inches away, rather than computer screens that are typically two feet away.

Incorrect room lighting, a certain distance from the screen, glare from the screen, poor sitting position and tilting of the head while looking at the screen. Computer screens light up. These are the shining powers that you are looking directly at. It is clearly hard on the eyes. In almost everything else you read, you saw reflected light. Light bounces off the paper at different wavelengths and is absorbed in different colors, which is not pleasing to the eyes and light. A computer screen directs light directly to the back of the eyeball. This is the main cause of computer vision syndrome. The difference between computer screens and television is what you watch. If you're watching a movie on your computer, you're fine, but if you're reading, you probably have computer vision syndrome. The screen is full of pixels. These pixels are not uniformly bright and are arranged in a grid pattern. Even at high resolution, your stars will still have a fuzzy edge. This constant extra stress is the root cause of computer vision syndrome. Another cause of CVS is a decrease in blinking. Blinking moistens the eyes, which is very important. Most people blink between 4 and 24 times per minute when looking at a computer screen. But when working on a computer, people tend to blink less, and the average number of blinks drops to only about six per minute.

2. Symptoms Include

- Temporary myopia, characterized by a short-term inability to clearly focus on distant objects within minutes or hours of computer use;
- Eye strain or fatigue, manifested as a sensation of weariness, discomfort, or a heavy feeling in the eyelids or forehead;
- Blurred vision, affecting both near and distant objects, occasionally accompanied by double vision or afterimages;
- Dry, irritated, or teary eyes;
- Heightened sensitivity to light; and
- Muscle spasms in the head, neck, back, and body, induced by maintaining an uncomfortable posture to achieve the desired alignment between the eyes and the computer screen.

Figure 1: Eyestrain or Eye Fatigue, Heaviness of the Eyelids or Forehead

Figure 2: Polyopia, Figure 2.1: Neck pain, backaches and muscle spasms from holding the body in awkward positions to maintain a desirable angle between eyes and screen

II. SCHIRMER'S TEST

The Schirmer test assesses the amount of tears the eye produces in relation to its moisture content. When someone has extremely dry or abnormally wet eyes, this test is used. It may cause corneal injury. It is usual to have negative moisture (greater than 10 mm in 5 minutes) on filter paper. Normally, the amount of tears produced by each eye is equal. Otto Schirmer A. is honored by its name.

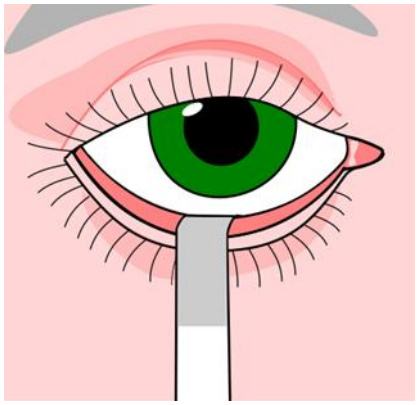

Figure 3: Schimer’s Test, Placing the Strip In the Lower Eyelid Pouch (Purpose: Assess Tear Production)

1. **Test Procedure:** The test operates based on the capillary effect, which mimics the way water in tears moves through the paper test strip, akin to liquid in a horizontal capillary tube. The pace at which the test strip absorbs moisture correlates with the rate of tear production. To conduct the test, the patient is advised to gaze upward while their lower eyelid is gently pulled down. The bent tip of the test strip is positioned in the eye, resting between the conjunctiva of the eye and the bulbar conjunctiva. Schirmer's test employs paper strips inserted into both eyes simultaneously, left in place for several minutes to gauge tear production. Typically, a small piece of filter paper is positioned in the lower eyelid's inferior fornix, and the patient keeps their eyes closed for 5 minutes. Subsequently, the paper is removed, and the degree of moisture is quantified. Following this 5-minute interval, the patient is asked to open both eyes and look upward, facilitating

the removal of the test strips. The Schirmer test score is ascertained by measuring the length of the moistened area on the strips, employing the accompanying scale. It's important to note that anesthetic is used to ensure that only basal tear secretion is assessed during the test.

Figure 4: Schimer test =0,00 in Sjogren's syndrome

Typically, a young person wets 15 mm of every paper strip. Age-related hypolacrimation means that 33% of healthy senior citizens may barely wet 10 mm in 5 minutes. Less than 5 mm of moisture is lost in 5 minutes by people with Sjögren's syndrome.

How to read results of the Schirmer's test:

- Normal which is ≥10 mm wetting of the paper after 5 minutes.
- Tear deficiency which is <5 mm wetting of the paper after 5 minutes.

2. **Treatment:** There are various solutions to address vision issues associated with virtual screens. Frequently, these concerns can be mitigated by maintaining routine eye care and adjusting how the screen is viewed. In certain situations, individuals who do not typically wear eyeglasses for their daily activities may find it beneficial to have glasses prescribed specifically for computer use. Additionally, those already wearing glasses may discover that their current prescription does not provide optimal vision for computer viewing.

- Prescription contact lenses or glasses might not be suitable for usage with laptops. It may be desirable to have lenses prescription to meet the specific visual requirements of laptop viewing. Maximizing visual abilities and luxury may also be achieved with the use of special lens designs, powers, tints, or coatings.

Some laptop users revel in problems with eye focusing or eye coordination that cannot be competently corrected with eyeglasses or contact lenses. An application of imaginative and A prescient remedy can be used to treat these precise issues. imaginative and prescient therapy, Moreover, visual training is an application that relies on visual exercises designed to enhance visual abilities. Its purpose is to enhance the coordination between the eyes and the brain, promoting more efficient teamwork. These eye exercises are designed to address issues related to eye movement, focusing, and the ability to coordinate both eyes. The treatment may involve in-office training as well as exercises to be performed at home. Proper body positioning when using a computer encompasses critical factors in preventing or alleviating CVS symptoms. This encompasses considerations like lighting conditions,

chair comfort, and ergonomic workspace setup, including screen placement and the incorporation of regular rest breaks.

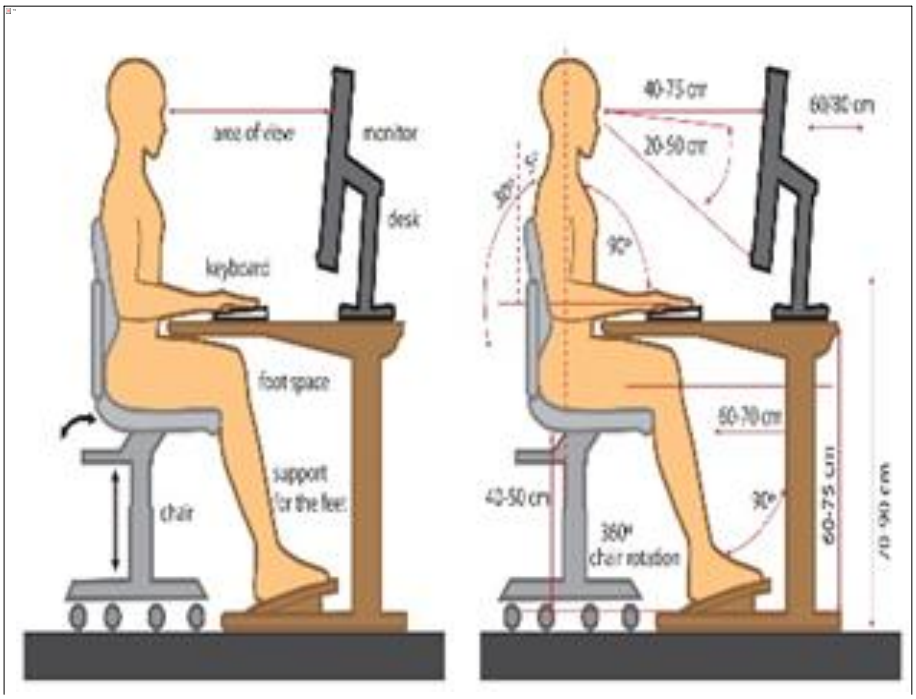

Figure 5: Viewing the Computer

- V**icinity of the computer display screen**. The majority find that watching on a laptop is more comfortable.

While looking down with the gaze. In ideal circumstances, the distance between the computer display's center and the eyes should be between 20 and 28 inches, or roughly four to five inches below eye level.

- **Reference substances.** These materials should be positioned below the screen and above the keyboard. If that isn't possible, you can utilize a report holder next to the reveal. The idea is to place the papers such that the head doesn't have to move from the file to the screen.

- **Lighting fixtures.** A PC display should be positioned to reduce glare, particularly from overhead illumination.

Windows or fixtures. Replace the lightbulbs on the table and cover the windows in your house with curtains or coverings. Lamps with lower power light bulbs.

- **Anti-glare monitors**. Remember to utilize a display glare filter out if there is no other method to lessen glare from light assets. The amount of light meditation on the screen is reduced by these filters.

- **Seating position.** Chairs need to hug the body and be softly padded. Adjust the chair peak so that your feet can rest comfortably flat on the ground. Wrists shouldn't rest atthe keyboard when typing; instead, fingers should be adjusted to provide guidance.

- **Relaxation breaks**. Try to keep your eyes relaxed when using the laptop for extended periods of time to avoid eyestrain. After several hours of nonstop computer use, give your eyes a 15-minute break. Additionally, after 20 minutes, take a 20- second break to explore the area and give your eyes a chance to refocus.

- **Blinking**. Try to blink frequently to reduce the likelihood of acquiring dry eyes from computer use. The front surface of the eye remains wet due to blinking. The symptoms of computer vision syndrome can be prevented or lessened with regular eye exams and appropriate viewing habits.

3. Treatments Include

- **Get A Laptop Eye Examination:** This is a crucial step in preserving your visual health and addressing issues related to computer vision. According to the National Institute of Occupational Safety and Health (NIOSH), it is highly recommended that individuals who work extensively on computers undergo a comprehensive eye examination before commencing their computer-related tasks and then annually thereafter. It is essential to inform your eye care professional about the frequency and duration of your computer usage, both at work and at home.

- **Use the Right Lights**: Eye strain is often a result of excessive or overly bright lighting, whether it's natural sunlight from outside or harsh indoor lighting. When using a computer, the ambient lighting in your workspace should be approximately half of what is typically found in most office environments. You can reduce external light by closing curtains, shades, or blinds. To diminish indoor lighting, consider using fewer light bulbs or fluorescent tubes, or opt for lower-intensity options. If feasible, arrange your monitor so that windows are to the side of it rather than in front of or behind it.

- **Reduce Glare:** Glare on walls and reflective surfaces, as well as reflections on the computer screen, can contribute to eye strain when using a computer. You can mitigate this by installing an anti-glare screen on your monitor. If possible, consider painting overly bright white walls with a matte finish in a darker color. Additionally, cover the windows to minimize external light. When it's challenging to reduce outdoor light, you may want to use a computer hood. If you wear glasses, consider having an anti-reflective (AR) coating applied to your lenses. This coating helps reduce glare by minimizing the reflection of light from the front and back surfaces of your eyeglasses and lenses.

- **Improve Your Display:** Flat-panel monitors and tablets are characterized by their reduced reflectivity and diminished glare, making them a better choice for minimizing eye strain. In contrast, older displays can exhibit a subtle "flicker" of pixels on the screen, which is a significant contributor to computer-related eye fatigue. Even if this flicker is not readily discernible, it can still induce eye strain during extended

computer usage. When in the market for a new flat-panel display, prioritize a screen with the highest available resolution, as it is closely linked to the "dot pitch" of the display. Typically, displays with a lower dot pitch offer crisper images. Opt for a display with a dot pitch of 0.8 mm or smaller. Additionally, consider choosing an exceptionally spacious screen. In the case of a desktop computer, select a display with a diagonal screen size of at least 19 inches.

- **Alter The Brightness and Contrast of Your Laptop Screen:** Modify the display configurations on your computer to align the screen's brightness with your immediate working environment. A practical method to confirm this is to examine the white background of this webpage. If it resembles a source of excessive light, it signifies an excessive brightness level. On the other hand, if it appears dim and gray, the screen might be excessively dark. It's also advisable to fine-tune the display settings to maintain a significant contrast between the screen background and the on-screen text, ensuring that the text size and color are optimized for the utmost comfort.

- **Blink More Regularly:** Blinking plays a crucial role when working on a computer as it helps rehydrate the eyes and prevents dryness and irritation. Research indicates that people tend to blink significantly less, around five times less than usual, while working on a computer. Prolonged periods of reduced blinking can lead to quicker evaporation of the tear film, resulting in deliberately dry eyes. Moreover, the dry air commonly found in many office environments can further accelerate tear evaporation, increasing the risk of dry eye issues. If you are experiencing symptoms of dry eyes, it is advisable to consult your eye doctor and inquire about the use of artificial tears during the day. It's important to note that lubricating drops should not be confused with drops designed solely to "get the red out." The latter contains ingredients that constrict blood vessels on the eye's surface to make them appear whiter but are not necessarily formulated to alleviate dryness and irritation. As a practice, consider blinking ten times every 20 minutes and closing your eyes slowly, as if drifting off to sleep. This exercise can be effective in rehydrating your eyes.

- **Exercise Your Eyes:** One common issue related to computer-related eye strain is focusing fatigue. To minimize the risk of fatiguing your eyes due to prolonged screen focus, take a break from your computer every 20 minutes and shift your gaze to a distant object, whether it's outside your window or down the hallway. This practice relaxes the eye's focusing muscles, reducing fatigue. Another exercise involves alternating your focus between a distant object and a nearby one for 10-15 seconds each, repeating this process ten times. This exercise can help lower the risk of your eyes experiencing a "lock-up" phenomenon, also known as accommodative spasm, after extended periods of computer work. Both exercises contribute to reducing the likelihood of computer-related eye strain. Remember to blink regularly during these exercises to decrease the risk of dry eyes associated with computer use. To alleviate eye strain, ensure you have adequate lighting and maintain the correct distance from the computer screen.

- **Take Common Breaks:** To reduce the risk of computer vision syndrome and prevent discomfort in your neck, back, and shoulders, make sure to take regular breaks throughout your workday at the computer. Many employees find it beneficial to

schedule two 15-minute breaks away from their computer during their work hours. A recent study conducted by the National Institute of Occupational Safety and Health (NIOSH) revealed that discomfort and eye strain were significantly reduced when computer users incorporated four additional 5-minute "mini-breaks" into their workday. Importantly, these extra breaks didn't negatively impact the workers' productivity. In fact, data entry speed noticeably improved with these additional breaks, leading to consistent work output despite the additional 20 minutes of break time daily.

During your computer breaks, take the opportunity to stand up, move around, and stretch your arms and legs, alleviating strain in your neck, shoulders, and back. You can also explore your local bookstore or consult your fitness center for guidance on a quick set of exercises you can perform during these breaks or after work to minimize tension in your arms, neck, shoulders, and back. Furthermore, make sure your desk lamp is positioned in such a way that it doesn't cast light directly onto your computer screen or into your eyes.

- **Adjust Your Notebook:** Staring at a computer display that is not positioned correctlyin relation to printed pages can lead to eye strain. To address this issue, consider placing written pages on a copy stand positioned adjacent to the computer screen, and ensure that the copy stand is well-illuminated. You may find it beneficial to use a desklamp for this purpose, but be cautious not to direct its light into your eyes or onto the computer screen. Additionally, improper posture during computer work can contribute to computer vision syndrome. It's important to make adjustments to your notebook and chair to achieve the ideal height. You might also consider investing in ergonomic furniture that allows you to position your computer screen approximately 20 to 24 inches away from your eyes. For comfortable head and neck positioning, ensure that the center of your screen is positioned about 10 to 15 degrees below your eye level.

- **Don't Forget Computer Eyewear:** To maximize comfort during computer usage, it can be highly beneficial to have a customized eyeglass prescription designed specifically for your computer work. This is particularly important for individuals who frequently wear contact lenses, as these can become dry and uncomfortable during prolonged computer use. Computer glasses are also a recommended solution for those who wear bifocals or progressive lenses, as these types of lenses may not provide the best visual experience for the distance to your computer screen.

4. **Preventive Steps :** If you have eye strain when using a computer, take the following precautions to help shield you from the majority of the symptoms:

- Position your monitor at a distance of 16 to 30 inches from your eyes, depending on your comfort level.
- Ensure it is situated 4 to 8 inches below eye level, allowing you to look slightly downward towards it, and tilt it slightly upwards, akin to a book or magazine. This downward gaze reduces exposure to your eyes, thus minimizing tear evaporation from the exposed surfaces.

- Place light sources at a right angle to your computer to prevent them from shining directly in your eyes or causing glare on your screen. If glare is an issue, consider installing a glare screen or a three-sided hood on your computer.
- Use an appropriately sized typeface, and experiment with different fonts and background colors to find what's easiest for you to read.
- Adjust your monitor's contrast settings to your preferred comfort level.
- Make a conscious effort to blink frequently to keep your eyes moist.
- Take short breaks, periodically shifting your focus away from the screen or closer to your eyes for a few seconds or minutes.
- Individuals over the age of 40 who wear bifocals may require special glasses designed for computer work.

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